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STATUS AND OUTLOOK OF THE STRATEGIC PETROLEUM RESERVE

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

SECOND SESSION

ON THE

STATUS AND OUTLOOK OF THE STRATEGIC PETROLEUM RESERVE

AUGUST 8, 1988

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STATUS AND OUTLOOK OF THE STRATEGIC PETROLEUM RESERVE

MONDAY, AUGUST 8, 1988

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 2:03 p.m., in room SD-366, Dirksen Senate Office Building, Hon. Bill Bradley presiding.

Senator BRADLEY. The committee will come to order. There is now a vote in progress, so I will put the committee in recess until I go vote and come back. So, the committee will now be in recess.

[Recess.]

OPENING STATEMENT OF HON. BILL BRADLEY, U.S. SENATOR FROM NEW JERSEY

Senator BRADLEY. The committee will come to order.

Today the committee is holding a hearing on the strategic petroleum reserve which I am chairing at the Chairman's request. If there is anything in energy policy on which Democrats and Republicans agree, on which the administration and Congress agree, and even on which the presidential candidates agree, it is that we have to fill the strategic petroleum reserve. All apparently agree that the SPR is the cornerstone of any energy emergency policy.

Despite this unanimous support, all is not well with the SPR program. Although the SPR is growing in absolute terms, the fill rate is not keeping pace with the rise in oil imports in the United States. One can view the amount of oil stored in the SPR in terms of number of days of U.S. net petroleum imports. Looking at it this way, the Energy Information Administration says the SPR peaked in size in 1985 at 115 days of net petroleum imports and declined thereafter. In fact, measured in those terms, the SPR will be smaller when President Reagan leaves office, less than 90 days' supply, than when he began his second term in 1985 when it was 96 days of supply.

If oil prices remain low, then at the current SPR fill rate, there will be only 65 days of net import supply in the SPR by 1995. The SPR will require a billion barrels in storage if we are to maintain the 90 day supply in the SPR that Secretary Hodel advocated before this committee four years ago.

The Federal budget treats oil stored in the SPR as an expense, not an asset. Likewise, the budget scoring creates no incentive for filling the SPR.

Deficit jitters have lead us to buy less and less oil per year for the SPR even though the price of oil has been declining and currently is at rock bottom. This is a bizarre phenomenon: lower prices and less purchases.

Perhaps we need to finance or fill the SPR differently. We are open to better ideas and the witnesses today we hope will provide some of the suggestions.

We have four separate witnesses, and we welcome all of you to the committee and ask you to try to help us think through the financing mechanism and how we might achieve the objective, which is true energy security, which can really be supplied only if we have adequate oil in the stockpile.

Our first witness today is Richard D. Furiga who is the Deputy Assistant Secretary for the Petroleum Reserve, Office of Fossil Energy at the Department of Energy, and he is accompanied by Guy Caruso, Director, Energy Emergency Policy and Evaluation, the International Affairs and Energy Emergencies of the U.S. Department of Energy. Let me welcome both of you to the committee and we welcome your testimony.

[The prepared statement of Senator McClure follows:]

OPENING STATEMENT
SENATOR JAMES A. McCLURE (R-ID)
COMMITTEE ON ENERGY AND NATURAL RESOURCES

STRATEGIC PETROLEUM RESERVE OVERSIGHT

Good afternoon. I wish to commend Chairman Johnston for holding this oversight hearing on the Strategic Petroleum Reserve. As I have said on previous occasions, and continue to believe, the evolution of our the United States' energy emergency preparedness must be a dynamic, not static, process. And the cornerstone of what limited energy emergency preparedness we possess as a nation is the Strategic Petroleum Reserve.

When we began this effort 12 years ago, successful completion of the Reserve was considered a monumental task. Then, and in the intervening years, we have been faced with many questions and problems regarding construction of the necessary facilities and acquisition of the oil. Yet, because of the dedication of many individuals, today we have about 551 million barrels of oil stored in the SPR, out of the 750 million authorized by the Congress.

But existence of the Reserve is not enough -- we also must have an effective policy for its drawdown and use. And the recent IEA exercise to test coordinated stock draw-down demonstrated the benefits to be achieved if drawdown of the Reserve is initiated early in an emergency on a coordinated basis.

If the Reserve is to be effective when needed, it is not enough to examine the status of the United States' capability. We also must examine the status and policies of other IEA member States. Strategic stocks held in other IEA member countries are now equivalent to more than 160 days of 1986 net imports, compared to the minimum legal obligation of 90 days. However, further improvements are needed in

strategic stocks by several IEA members who continue to fail to meet their IEA obligations in this regard. It is not enough for some IEA members like the United States to meet its obligations, all IEA members must meet their obligations.

As the United States approaches 75 percent completion of a 750 million barrel reserve, it is appropriate for the Congress to once again examine alternative financing concepts. This is not a new concern of the Committee, but a continuing one since 1981 when SPR financing was initially placed off-budget. The Gramm-Rudman-Hollings legislation has since returned SPR financing to the Federal budget.

It is appropriate that we once again examine the issues that accompany alternative financing mechanisms. Each possesses its strengths and weaknesses; and each must be considered from the perspective of who pays and the level of government involvement or the degree of private sector involvement. If we are to select an alternative, the paramount concern is who controls SPR drawdown. Drawdown is now controlled by the President based on national energy security and economic concerns. If we are to consider changing this situation, even for a part of the Reserve, we must fully understand the implications of such action.

In this regard, I am encouraged by the extensive review that is now taking place within the Department of Energy as well as the General Accounting Office. Next year we must again extend the basic authority for the Energy Security Reserve as contained in EPCA. I hope that these reviews will be completed on a schedule that recognizes that fact. Thank you, Mr. Chairman.

STATEMENT OF RICHARD D. FURIGA, DEPUTY ASSISTANT SECRETARY FOR PETROLEUM RESERVES, OFFICE OF FOSSIL ENERGY, DEPARTMENT OF ENERGY, ACCOMPANIED BY GUY CARUSO, DIRECTOR, ENERGY EMERGENCY POLICY AND EVALUATION, OFFICE OF INTERNATIONAL AFFAIRS AND ENERGY EMERGENCIES

Mr. FURIGA. Thank you, Mr. Chairman. I ask that my testimony be entered into the record, and I will give a few brief oral remarks.

Mr. Caruso is sitting at my right, whom you introduced.

It is my pleasure to be here today, Mr. Chairman, to talk about the current status and outlook of the SPR. I would like to note at the outset that you are the only Member of the Senate to ever visit a SPR storage site, 3 or 4 years ago.

Senator BRADLEY. It is true which some people point to as evidence of—never mind. [Laughter.]

Mr. FURIGA. As of July 1988, we had approximately 551 million barrels of oil stored in the SPR. Our current maximum drawdown rate, or the rate that we can remove that oil from the storage caverns, is 3.5 million barrels per day. Now, the rate that that oil can be entered into the commercial distribution system, which we call our distribution rate, is 3.2 million barrels a day.

We have embarked over the past several years on a program of what we call distribution enhancements in which we are trying to keep pace with changes in industry. The Administration has said that we are not going to tell industry not to change. The SPR will adapt to changes in the commercial system, and that is what we are doing.

Over the last 12 years, the Reserve has acquired and developed six sites with underground crude oil storage in salt domes along the coasts of Texas and Louisiana. And we have built a government-owned marine terminal on the Mississippi River at St. James.

Development and fill of the Weeks Island and Sulphur Mines sites are complete. Capacity development has been completed at Bryan Mound, our largest site, and will be completed at the West Hackberry site by the end of this fiscal year, September 30. Capacity development at our new site at Big Hill in Texas and the Bayou Choctaw site, which you visited, will be completed in 1991.

Our long-range plans call for relocating the oil that we have at Sulphur Mines, only 26 million barrels. It is a very small site and considering the per barrel cost of operating that site, it makes sense to move that oil to one of our larger sites and put Sulphur Mines out of business.

I mentioned the storage sites that were being completed. That is the system that we currently have. We have Bryan Mound in Texas down near Freeport, which is served by the Phillips terminal. As part of our distribution enhancement program, last year we completed a million barrels a day pipeline from Bryan Mound to the Arco terminal in Texas City, which not only gives us access to more tanker docks, but by other pipelines, we can get right into the Houston ship channel.

Big Hill is our newest site near Beaumont, Texas. We are currently in the stage of reaching or developing the capacity on all 14 caverns at that site. West Hackberry and Sulphur Mines are con-

nected by a government-owned pipeline to the Sun terminal in Nederland, TX, which is also where the Big Hill site will be connected.

Weeks Island and Bayou Choctaw are connected by a government-owned pipeline to our own St. James terminal on the Mississippi River where, if needed, we can out-load across the St. James dock, and, at that point, we are also connected to the Capline Pipeline which goes up to the midwest section of the country.

This chart very quickly shows the relative sizes of our sites. Bryan Mound is the largest; West Hackberry is second. Big Hill will be third, and you can see how very small Sulphur Mines is in comparison with the rest of the sites. I would like to add that I will leave these charts with the committee for whatever use you may have for them.

Through Fiscal Year 1988, a total of $18.7 billion will have been spent on the SPR. That includes $3.1 billion for the system that you just saw on the first chart. The $3.1 billion also covers all the land that we had to buy, all surface construction, over 250 miles of very large diameter pipeline and the St. James terminal which we built. $15.6 billion of the $18.7 billion was for oil acquisition.

Big Hill, if I could return to that for a moment, is one of our good news stories. Big Hill, when it was designed and conceived, was estimated to cost $819 million, or $5.85 a barrel to develop the facility, exclusive of the oil. With the site currently in a leaching stage—and essentially we have spent all the money—our new estimate is $400 million or half the original estimate at a cost of $2.50 per barrel.

In January 1988 the National Society of Professional Engineers named Big Hill one of the six top U.S. engineering achievements of 1987. And we were in good company. The Voyager aircraft was one of the projects also selected.

The full year Continuing Resolution for Fiscal Year 1988 signed by the President in December of 1987, provided $439 million for the SPR petroleum account, which is the account we use to buy our oil. That was to allow an average fill rate of 50,000 barrels per day. The Congress also put an outlay cap on our expenditures for this fiscal year of $266 million. Even with that outlay cap, because of the low prices that you mentioned, we expect to fill at a rate of 57,000 barrels per day this fiscal year instead of 50,000 barrels per day.

Numerous parties have talked to us and other people about alternative financing schemes for the SPR. They have not been adopted up to this point in time for numerous reasons. Probably three of the most important would be first that the government would not own or control the oil which we consider essential. Second, in many cases although outlays would have been deferred, we would have needed budget authority for the transaction up front. And third the proposed concepts did not recognize the public methods of budget accounting, and thus a score-keeping problem would have resulted.

We have offered an alternative financing scheme for filling the SPR and that is to use the proceeds from selling the Government's interest in the Naval Petroleum Reserves to complete the 750 million-barrel SPR and also to create a defense stockpile on the Gulf

coast. We have submitted legislation to the Congress to this effect, but no action has been taken on that, as of yet.

However, we are currently reexamining alternative financing options. We have commissioned a study; we expect the results of that study in late fall. We felt it prudent, especially in light of current deficit problems, to ensure that no fiscally sound option for achieving the President's commitment to a 750 million barrel reserve is overlooked. That study is ongoing.

We also commissioned a study to reassess the ultimate size of the SPR. It has been since 1982 that an in-depth study was accomplished. And in light of current consumption, levels of imports, prices and market trends, again we felt it prudent to do such a study. The results of that study are due in late fall also.

The program has matured, Mr. Chairman, and as you mentioned, has enjoyed the support of the Congress as well as that of top energy management from Secretary Herrington on through the chain of command.

We appreciate being here. That concludes my statement, and we will be pleased to answer any questions you might have, sir.

[The prepared statement of Mr. Furiga follows:]

Statement of Richard D. Furiga
Deputy Assistant Secretary for Petroleum Reserves
Department of Energy
Before the
Committee on Energy and Natural Resources

August 8, 1988

It is my pleasure to appear before you today regarding the current status and outlook for the Strategic Petroleum Reserve. I will provide recent information and considerations regarding the fill rate and drawdown capability, financing approaches and the size of our Nation's strategic reserve.

STATUS AND ACCOMPLISHMENTS

The Strategic Petroleum Reserve (SPR) was authorized in 1975 by the Energy Policy and Conservation Act P.L. 94-163 as a response to the '73-'74 OPEC embargo. The goal was an early fill to 150 million barrels (MMB) within three years and a seven year target of 500 MMB, with an ultimate fill goal of up to one billion barrels. Congress has subsequently approved development plans for government storage of 750 million barrels.

Over the last 12 years, the Strategic Petroleum Reserve has acquired and developed six sites with underground crude oil storage in salt domes along the coasts of Texas and Louisiana, and developed a Government-owned marine terminal on the Mississippi River at St. James, Louisiana. These six storage sites are organized into three distribution systems and connected by Department of Energy pipelines to commercial crude oil pipeline networks and marine terminal facilities for drawdown/distribution.

Development and fill of the Weeks Island and Sulphur Mines sites have been completed. Capacity development has been completed at the Bryan Mound site and will be completed at the West Hackberry site by September 30, 1988. Capacity development at the Big Hill and Bayou Choctaw sites will be completed in 1991. Long range plans provide for relocation of the Sulphur Mines oil to Big Hill and decommissioning of the Sulphur Mines facility.

All major surface construction necessary to achieve 750 MMB of crude oil in storage has been completed. Capacity development by leaching is on schedule with 600 MMB of total storage capacity to be achieved by September 30, 1988 and 750 MMB of total storage capacity to be achieved by the end of 1991.

The average delivered cost of crude oil acquired thus far during FY 1988 is $16.72 per barrel. The average cumulative cost of the oil in the SPR is $27.87 per barrel including all costs for oil, transportation, terminalling, customs duties, taxes and administration.

As of July 1988, approximately 551 million barrels of oil were stored in the SPR. The average fill rate for the first half of FY 1988 was 60,374 barrels per day. The projected average for the fiscal year is approximately 57,000 barrels per day. Oil purchases are currently being made from the Mexican state-owned oil company, Petroleos Mexicanos (PEMEX). The contract allows for changes to the volumetric lifting rate for the crude oil by mutual agreement. The price is set by formula and is changed daily to reflect the movement in daily spot market prices of Alaskan North Slope, West Texas sour and West Texas intermediate crude oils.

The current SPR drawdown capability (i.e., the rate at which oil can be withdrawn from storage) is 3.5 MMB/D. In the on-going distribution enhancements program for increasing SPR distribution capability, enhancements to date have created the capability to distribute 3.20 MMB/D into the United States commercial transportation and refining systems. Upon Presidential determination of a national emergency, the SPR can currently deliver 3.20 MMB/D into the United States refining infrastructure for about four months and a lesser amount thereafter, with a sweet/sour crude oil mix that will enable most refiners to meet their desired product slate. Sale of SPR oil is to be made through a competitive sales process.

Current policy and plans call for achieving a fill level of 750 MMB with a distribution capability of 4.5 MMB/D. Decisions have not yet been made regarding the methods or timing for developing a final 250 MMB.

DEVELOPMENT OF SITES AND DISTRIBUTION CAPABILITY

Six storage sites make up the SPR: the Big Hill and Bryan Mound sites in Texas, and the West Hackberry, Weeks Island, Sulphur Mines and Bayou Choctaw sites in Louisiana.

The Big Hill storage site is located in Jefferson County, Texas, twenty miles southwest of Beaumont. The Department of Energy acquired this undeveloped site in 1982 and will develop fourteen 11.5 MMB caverns through solution mining to provide a total site storage of 160 MMB. All caverns are currently in a leach mode.

The Bryan Mound site is located in Brazoria County, Texas, approximately three miles south of Freeport. The Department of Energy acquired this storage site in 1977 and converted four existing brine caverns to oil storage. In 1987, sixteen additional 10 MMB storage caverns were completed at Bryan Mound, providing a total site storage capacity of 226 MMB.

The West Hackberry site, in Cameron Parish, Louisiana, was acquired in 1977 and five existing brine caverns were converted to oil storage.

The Department of Energy is near completion of its plans to develop seventeen additional 10 MMB storage caverns at West Hackberry, providing a total site storage capacity of 219 MMB, and completion is expected in September 1988.

The Weeks Island site, located in Iberia Parish, Louisiana, was acquired in 1977 and an existing conventional salt mine with a capacity of 73 MMB was converted to oil storage. Development and fill of this site were completed in 1982.

The Sulphur Mines site in Calcasieu Parish, Louisiana, was acquired in 1979 and three existing brine caverns with a capacity of 26 MMB were converted to oil storage. Development and fill of this site were completed in 1983.

The Department of Energy acquired the Bayou Choctaw site in Iberville Parish, Louisiana, in 1977 and converted four existing caverns to oil storage. The Department of Energy acquired a fifth existing cavern in 1985 through an exchange agreement with Union Texas Petroleum Company. The Department of Energy plans to develop an additional 16 MMB of capacity at Bayou Choctaw, providing a total site storage capacity of 72 MMB. Development will be completed by the end of FY 1991.

The six SPR sites are grouped into three distribution complexes that serve both commercial pipeline and marine transport systems. Originally, each complex served a major interstate pipeline extending into the mid-section of the country. Market changes in the early 1980's forced the conversion of two of these pipelines to natural gas carriage, and they are no longer available for SPR use. To compensate for these pipelines, the SPR program has undertaken a major effort to enhance its distribution capability.

A 46-mile long, 40-inch diameter pipeline connecting Bryan Mound near Freeport, Texas to the ARCO Terminal in Texas City was completed in 1987; it added nearly 1 million barrels per day to the SPR distribution capability. In St. James Parish, Louisiana, a 900-foot pipeline connection has been completed between DOE's St. James distribution facility and the Capline Pipeline (which continues to serve midwest refineries); this distribution enhancement added 240,000 barrels per day to the SPR's distribution capability.

The Department of Energy is continuing other distribution enhancements to ensure that the current SPR distribution capability of 3.2 million barrels per day can be expanded to 4.5 million barrels per day as the reserve reaches its current goal of 750 million barrels. The SPR is currently evaluating bids for construction of a crude oil pipeline that would connect the West Hackberry storage site to the Texas 22-inch pipeline. The Texas 22-inch pipeline, in turn, connects to local refineries and provides potential for ties into commercial terminals and docks in the Beaumont/Port Arthur, Texas area and to marine terminals at Lake Charles, Louisiana.

We are also evaluating various options for improving the terminalling capabilities at several commercial marine docks that are, or can be,

linked to SPR storage sites. Connecting SPR sites to a larger number of marine terminals is necessary not only to increase the Reserve's gross distribution capability but to give us greater flexibility in adapting to buyers' delivery preferences, should an energy disruption occur.

DISTRIBUTION PLAN

The current plan for distributing SPR oil, in the event that the SPR is drawn down in response to a severe energy supply interruption or in order to meet obligations of the United States under the Agreement of the International Energy Program, is provided in the "Strategic Petroleum Reserve Drawdown (Distribution) Plan," Amendment Number 4, of December 1, 1982.

The Drawdown Plan provides that, upon the President's decision to use the SPR, the principal method of distributing SPR oil will be price competitive sale with the oil being sold and delivered to bidders offering the highest prices. The sale will be open to the largest possible universe of eligible buyers to ensure efficient distribution of SPR oil except insofar as necessary to assure performance and payment. The plan also provides that, in any calendar month, the Secretary of Energy may direct the distribution of up to 10 percent of the volume of oil sold in that calendar month in a manner which the Secretary selects at his discretion. The price for such oil will be the average price of SPR oil sold at the contemporaneous competitive sale, or at the most recent competitive sale, if no contemporaneous competitive sale is held.

The SPR competitive sales process would start with the issuance of a Notice of Sale. The Notice of Sale would indicate the amount, characteristics and location of the crude oil being sold and the delivery dates and the procedures for submitting offers, as well as provide other information pertinent to a particular sale. In addition, it would specify what contractual provisions and performance and financial responsibility measures would be applicable.

Drawdown procedures are established and in place to permit an early use of the SPR. These procedures allow for the sales process to be completed and deliveries to commence within three weeks after a decision to drawdown is made by the President. The Administration expects the very existence of the SPR to have a price-dampening effect on a shaken market reacting to a disruption threat.

ENERGY IMPORTS AND THE STRATEGIC PETROLEUM RESERVE

Based on EIA's Annual Energy Outlook of 1987, the 750 MMB SPR will provide slightly more than 90 days of crude oil import protection through the year 2000. Using net imports (net crude oil and petroleum product imports minus imports destined for SPR), the number of days of import protection would be lower. However, oil import patterns have shifted in the United States significantly since the early and mid 70s, primarily from supplies in the Mideast to supplies

in Mexico, Canada, the North Sea and Venezuela. In addition, it should be noted that the SPR was not conceived or planned to replace total imports, but rather for increasing oil availability in a worst case scenario.

Although oil import rates have increased since 1985, the SPR, with continued fill, has maintained approximately 90 days of total net import protection. The Administration and the Congress have continued to view the SPR as a national priority. The Administration is presently focusing upon its current commitment to reach 750 MMB in storage and distribution enhancements to provide for 4.5 MMB/D drawdown.

In addition, the planners and analysts for the SPR are continuing to study questions regarding its use and flexibility, ultimate size and economic benefits as described in the Administration's Energy Security Report. Efforts to reassess SPR size were initiated in early July, and a draft final report is scheduled for presentation to the Office of Petroleum Reserves in early November of this year. Past studies, the most recent of which was completed in 1982, have indicated potential economic benefits with reserve sizes at and above 750 million barrels, assuming significant probability of a six-month closure of the Persian Gulf. The current study will reassess the magnitude of benefits and costs associated with incremental reserve volumes and the credibility of scenarios in which those benefits and costs might be realized. The study will be based on the most current projections of petroleum consumption, levels of imports and world oil market trends. The period addressed will be 1990 through 2020. The new effort is needed for a fresh look at the issue of SPR size in view of rising imports of crude and products, and the extended period to be addressed.

REDUCING IMPORT PRESSURE

A number of proposals and activities have been offered to improve and sustain domestic oil production, thereby reducing import pressure. These include advancing technologies to recover more of the 300 billion barrels of U.S. oil resources not economically recoverable with existing technology, allowing environmentally sound exploration offshore and on the coastal plain of the Arctic National Wildlife Refuge in Alaska, repeal of the Windfall Profit Tax and consideration of incentives for increased capital formation in the industry and for stimulation of research, exploration and development.

The Department of Energy is increasing its priority for advanced geoscience research, coupled with the development of advanced technologies for more complete and economic recovery of our domestic oil. The National Petroleum Council also completed a study requested by Secretary Herrington and has recommended the establishment of an industry forum to facilitate industrial cooperative R&D projects for oil. The Department of Energy is also moving aggressively forward on its program for Innovative Clean Coal Technology, that will provide economic and environmentally attractive technologies for continued and enhanced use of our enormous domestic coal reserves.

In addition, the Department of Energy supports policy initiatives and cooperative and collaborative international projects on a quid pro quo basis, with the end objective of enhancing and sustaining free world, secure energy supplies for international and domestic commerce.

FILL RATE AND FINANCING

The Administration has proposed selling the Federal Government's interest in the Naval Petroleum Reserves near Bakersfield, California and Casper, Wyoming to provide additional funds to increase the rate of filling the SPR to 100,000 B/D and to establish a separate 10 MMB Defense Petroleum Inventory. The Department of Defense has agreed that the Defense Petroleum Inventory is a reasonable energy security offset for the sale of these Naval Petroleum Reserves. A separate Defense Petroleum Inventory with drawdown controlled by the Department of Defense would provide an emergency source of oil for defense purposes. It would be sited so as to be easily accessible to major refining centers and have constant drawdown capability, in contrast to the diminishing resources of the Naval Petroleum Reserves. Congress has not acted on this proposal, but has requested that the GAO review financing alternatives to fill the Strategic Petroleum Reserve. The Department of Energy's Office of Petroleum Reserves staff is cooperating in that effort, and the Department of Energy looks forward to exploring the benefits of alternative financing options that will improve the Nation's petroleum reserves.

While we recognize that Congress has reluctantly imposed outlay caps on SPR oil acquisition funds in order to meet deficit reduction targets, these caps could limit oil deliveries, particularly in times of low oil prices. Limited purchase authority could also complicate placement of secure buy and transportation orders for advance purchases. Removing these restrictions would give the Department of Energy somewhat more flexibility to take advantage of unique opportunities and lower prices to fill the SPR faster at a lower cost, thereby improving the level of our import protection. As an example, if it were not for the budget outlay restraints placed on SPR FY 1988 funding, we presently could be buying and receiving somewhat more oil this year, at a time when prices are rather advantageous.

Alternative SPR funding can be considered from the perspective of who pays, the level of Government involvement or the degree of private sector involvement (at the industry, region, or the consuming public level), what type of financing vehicle is involved, who controls what is created and who benefits. Each alternative involves pluses and minuses. Each attempts to realize certain program ends. Selection of an appropriate alternative involves consideration of economic and institutionalized realities (such as the Federal deficit issue, attitudes toward tax increases and asset sales, Congressional budget scoring procedures, Treasury and OMB treatment of sales receipts and the like).

A convenient way of categorizing alternatives is between the source of funding, public or private. Because anticipated Federal budget shortfalls loom large now, private funding, which would remove SPR

purchases from the public accounts, may become of increasing interest. Five generic sources of private funding exist: (1) public capitalization of the SPR, (2) public capitalization of the government's interest in the NPRs or of the NPR oil and gas, and dedicating the proceeds to the SPR, (3) debt financing of the SPR, (4) development of an Industrial Petroleum Reserve, and (5) mandated private contributions to the SPR.

A GAO review of alternative financing and a Department of Energy examination of alternatives have begun, but conclusions are premature at this time. The Department's current review, begun in July, is scheduled to be provided to the Office of Petroleum Reserves in November. It seems particularly prudent to reassess these matters, especially in light of current deficit problems, to ensure that no fiscally responsible option for achieving the President's commitment to a 750 million barrel reserve is overlooked.

Unfortunately there is likely no such thing as a "free lunch" in the form of alternative financing. Someone will pay, and ultimately the cost of buying and storing oil for our Nation's energy security must come from dedicated asset capitalization or divestiture, taxation or regulation, or a combination of these. While the Administration would like to increase the fill rate of the SPR, it will not accept increases in general taxes or regulatory mandates to finance or force the storing of oil. Therefore, while some financial alternatives may reduce costs in the general revenue accounts, a higher level of SPR fill may likely require some displacement of other spending programs to accomplish this national priority.

OPPORTUNITIES

I would like to close, however, by itemizing some opportunities before us. We can:

- Continue fill of the SPR at the fastest possible rate while recognizing budget constraints;
- Continue to develop storage capacity to the currently approved level of 750 MMB;
- Continue the on-going distribution enhancement program to achieve a distribution capability of 4.5 MMB/D;
- Continue to train and exercise personnel, systems and procedures for drawing down the SPR to assure mission readiness;
- Continue a public awareness program to acquaint industry and the public with the mission of the SPR and how it will function at the time of an energy emergency and the economic benefits provided;
- Maintain efficient response plans for flexible use of the reserve, if and when required; and, finally,

- Study and implement, if appropriate, alternative financing mechanisms for fill and/or expansion of SPR capacity to 1 billion barrels, as market and government fiscal conditions and priorities warrant.

This completes my formal statement, Mr. Chairman. I will be pleased to answer any questions you may have.

Senator BRADLEY. Thank you very much, Mr. Furiga, for your testimony. I do remember my visit. I think that you have given us your opinion, as well as an update on the SPR.

And I wondered, you said you could deliver 3.2 million barrels a day for 4 months, and a lesser amount thereafter. How much of a lesser amount thereafter, and how long would it last?

Mr. FURIGA. As we draw down the reserve at the maximum rate, as you said, we can sustain that for 4 months. And then as caverns at the various sites empty, we have a natural decay curve, as we call it. After 120 days—after 4 months, we drop to 2 million barrels per day. And I believe in 6 months, 95 percent of the reserve can be deployed. Of the total oil in reserve, in 6 months 95 percent is gone, but for 4 months we'll be at the maximum rate of 3.2. Then it drops to 2 million barrels per day.

Senator BRADLEY. So, if you go 3.2 for 4 months and 2 million for 2½ months, you have emptied the reserve.

Mr. FURIGA. It's 5 months; it's 150 days. Yes, sir, 95 percent can be deployed within that time period.

Senator BRADLEY. Now, in terms of the amount of oil that we are putting in the reserve, we are now adding oil at a rate below the import increase level. Right?

Mr. FURIGA. I believe that is true, sir, yes.

Senator BRADLEY. So, that means in terms of days of supply, we have less now than we did a year ago.

Mr. FURIGA. Well, that term "days of supply" to me personally is not a magic number for several reasons, although I know the 90 days has been talked about for the past 4 or 5 years.

Senator BRADLEY. Well, you say on page 4 that a 750 million SPR will provide more than 90 days crude oil import protection. Then you also say, using net imports would result in a lesser number of days of protection.

Mr. FURIGA. One is using crude oil imports and the other is using net imports, sir. Net imports, of course, make the picture look worse.

Senator BRADLEY. Could you explain how?

Mr. FURIGA. Well, net imports include crude oil and product. So, the number that you are dividing into the 750 or the 551 is larger. Therefore, your days of supply of total imports go down.

But what has changed since the early 1970s is that, where we are importing our crude oil from—you know, our primary sources, even though Saudi Arabia——

Senator BRADLEY. Just in terms of the methodology, doesn't EIA use the net imports?

Mr. FURIGA. Yes, sir.

Senator BRADLEY. So, when they say 90 days' supply, when Japan says it has a 110 day supply or whatever, they are referring to net imports?

Mr. FURIGA. For purposes of the IEA, sir——

Senator BRADLEY. IEA.

Mr. FURIGA [continuing]. The United States counts both the SPR and private stocks to get that 90 day commitment.

Senator BRADLEY. And Secretary Hodel also testified in terms of net imports.

Mr. FURIGA. It is my understanding that he did, sir, yes.

Senator BRADLEY. So, why are you now testifying in terms of just crude oil as opposed to net imports?

Mr. FURIGA. That was one number we used. We do use net imports as an official matter.

Senator BRADLEY. So, net imports is the official.

Mr. FURIGA. Yes, sir.

Senator BRADLEY. And in terms of net imports, how are you now versus a year ago?

Mr. FURIGA. We are less than we were. We are just a little bit under 90 days, about 89 days. The SPR was never intended to replace total imports.

Senator BRADLEY. But if we kind of keep the current fill rate, and if IEA's low oil price scenario is correct, that means that by, say, 1995 we will end up with significantly less in terms of net import coverage. Right? Like about 60–65 days as opposed to 90–95 days?

Mr. FURIGA. Yes, sir.

Senator BRADLEY. So, essentially we are going to get less coverage.

Mr. FURIGA. In terms of total imports, yes, sir.

Senator BRADLEY. And that presents a problem if you have an energy security objective in mind.

Mr. FURIGA. Yes, sir.

Senator BRADLEY. So, that should be added emphasis to increase the fill rate, particularly given the price of oil even today. Wouldn't you agree?

Mr. FURIGA. Yes, sir. In our Fiscal Year 1988 budget request, we proposed 75,000 barrels a day to the Congress, and we received 50,000 barrels a day——

Senator BRADLEY. Let's say we went back to what we were in the early 1980s, 125,000 barrels a day. Would there be a supply bottleneck at all, do you think, if we wanted to——

Mr. FURIGA. We are getting to the position where our capacity is being developed as we fill.

Senator BRADLEY. Right now you have about 50 million barrels spare capacity?

Mr. FURIGA. It's a bit under 50 at the end of the fiscal year. Yes, sir. We will have 600 million barrels of capacity, and approximately 556 million barrels of oil in that capacity.

Senator BRADLEY. Do you have any position on whether we should exceed the 750 million barrel SPR?

Mr. FURIGA. That is what we are studying right now. We have commissioned a study of the ultimate size of the SPR to take into consideration the changes that have occurred in the industry import patterns and prices since 1982.

Senator BRADLEY. When will you have that done?

Mr. FURIGA. We expect the report to my office in late fall, sir.

Senator BRADLEY. At which point you will recommend whether it should go to 1 billion or above 750 million?

Mr. FURIGA. Over 750, yes, sir.

Senator BRADLEY. When we get into this debate about buying more oil, we always get to the question of alternative financing mechanisms, and then we are usually confronting the CBO across the narrow table with a lot of glasses of water in between and a

couple of yellow note pads. And I am curious to hear. Have you done any investigation of the question of budget score-keeping?

Mr. FURIGA. That is what we are doing right now, sir. In addition to the study that we commissioned on the ultimate size, we have also commissioned a study on alternative financing. We have a contract in place for that. And, again, the time frame on receiving that report is late fall.

Senator BRADLEY. As of right now, do you know any way of spreading the cost of oil purchases in terms of budget accounting?

Mr. FURIGA. No, sir, I don't. I have not seen a scheme or a financing method that would be as effective as using appropriated funds to buy the oil with cash.

Senator BRADLEY. So, you have investigated no individual proposals?

Mr. FURIGA. We have had numerous ones in the past, sir. We are taking another look now at those alternative financing schemes and new ones that are coming out, as you know, frequently.

Senator BRADLEY. What would you say off the top of your head is the proposal that right now gives the lowest overall cost to the taxpayer?

Mr. FURIGA. I'd have to provide that for the record, sir. I can't do it off the top of my head.

[The information follows:]

After some reflection, I think that the proposal that gives the lowest overall cost to the taxpayer is to pay for the oil with current overall cost to the taxpayer is to pay for the oil with current tax receipts provided through the appropriation process or current receipts from the sale of Naval Reserves oil. If we pay as we go, the taxpayer will receive the benefits of the longer term appreciation in the value of the oil when it is eventually used, offsetting the taxpayer's cost of this strategic oil insurance. Although oil prices fluctuate, reducing and increasing the Reserve's value, projections show appreciation over the long term.

Our review of these alternative financing schemes may find a better value for the taxpayer—particularly in the case of incremental fill at a time of depressed oil prices, over what the budget can now afford. That is why we are taking a look at them to determine if there is any that can meet our policy criteria for strategic stocks and save the taxpayer some money. Someone may have come up with a financing innovation that will work, and we want to make sure it is not missed if it is real.

Senator BRADLEY. In terms of your—just thinking about this, since the subject of the hearing is going to be, in addition to your testimony, what are the alternative financing mechanisms, have you given any thought as to any kind of criteria or principles as to who should cover the cost of the stockpile? How should you spread it among consumers, taxpayers, producers? Any general rules?

Mr. FURIGA. I think by using the regular Treasury borrowing which means taxpayers, if I can put it that way. Normal appropriations, in my mind, is the best method that I have seen to date, absent using the proceeds from selling the Naval Petroleum Reserves to finance the SPR.

Senator BRADLEY. Your first choice is to sell the naval reserve and take the money and put it in a bank account and write checks to buy the oil. Your second is to raise taxes or cut spending elsewhere and free up the dollars in the budget process.

Mr. FURIGA. Not to raise taxes, sir. To free up money.

Senator BRADLEY. I was saying that not in an attempt to get you to restate an administration position, but rather just to get your

sense of the sophistication that you are using in approaching the problem of trying to finance the reserve. Basically you mean sell the reserve, take the dollars, buy, raise taxes or cut spending. Take the budget dollars and buy, all kind of very straightforward budget operations. Right?

Mr. FURIGA. Right, but with the past schemes that have been presented to us, we have looked at those very closely—our lawyers and economists. And right now our current contractor reviewing this is a recognized expert in the field, and I feel pretty comfortable that we are going to get a good product from him.

Senator BRADLEY. And when is the date that you said you would have these two studies?

Mr. FURIGA. Late fall, November, sir, of this year.

Senator BRADLEY. In November 1987, you will have a study——

Mr. FURIGA. Of 1988, sir.

Senator BRADLEY [continuing]. Of 1988 you will have a study on alternative financing mechanisms and on the advisability of going above a 750 million barrel SPR.

Mr. FURIGA. That is our current schedule, sir.

Senator BRADLEY. Do you have another point you wanted to make?

Mr. FURIGA. We were talking about Big Hill, the fourteen 10-million barrel caverns. Just to give people an idea of the magnitude of what is occurring down in the gulf coast. Big Hill will have 14 of these caverns shown in purple. They are 10 million barrels each. They are 2,000 feet tall. That is the World Trade Center in the middle of the chart next to one cavern. We can put the World Trade Center in just one of our caverns. And the Washington Monument—you can lose many of those in it.

Senator BRADLEY. And you have how many caverns?

Mr. FURIGA. At Big Hill we will have 14 of those.

Senator BRADLEY. Fourteen.

Mr. FURIGA. And that is our third largest site.

Senator BRADLEY. Fourteen caverns in which you could put both the World Trade Centers. So, you could have 28 World Trade Centers underground down there.

Mr. FURIGA. That is right, yes, sir.

Senator BRADLEY. Well, let me tell you that you deserve to have received the award that you got on engineering. It is really quite extraordinary.

Thank you very much for your testimony.

Mr. FURIGA. Thank you, Mr. Chairman.

Senator BRADLEY. The next witness will be Mr. Albert F. Hummel, Senior Vice President, Printon Kane Capital Corporation, New York, NY, and he will be accompanied by Rande A. Leonard, Consultant for Special Projects, Printon Kane of New York, NY.

Let me welcome you to the subcommittee and feel free to proceed. We are anxious to hear your testimony.

STATEMENT OF ALBERT F. HUMMEL, SENIOR VICE PRESIDENT, PRINTON KANE CAPITAL CORP., ACCOMPANIED BY RANDE A. LEONARD, CONSULTANT FOR SPECIAL PROJECTS

Mr. HUMMEL. Mr. Chairman, we would like to thank you for inviting us to this hearing. And I have a prepared statement which I would like to propose to enter into the record.

Senator BRADLEY. Your full statement will be in the record as if read in full.

Mr. HUMMEL. Thank you, Mr. Chairman.

And I would like to turn this part of the presentation over to my colleague, Mr. Leonard, and we will both be available for any questions that you might have at the end of the proposal.

Senator BRADLEY. Mr. Leonard, you are recognized for purposes of making the presentation.

Mr. LEONARD. Thank you, sir.

We are very enthusiastic about our proposal because we believe earnestly that it will save $153 billion over the next 30 years in terms of financing costs.

Senator BRADLEY. How much?

Mr. LEONARD. It's $153 billion.

Senator BRADLEY. You have got my attention. The proposal that you are about to make will save $153 billion over how long?

Mr. LEONARD. Over 30 years.

Senator BRADLEY. Thirty years.

Mr. LEONARD. Again, we are dealing with the financing costs, not with acquisition costs.

Senator BRADLEY. Right.

Mr. LEONARD. The problem that we are wanting to address is the problem of high real interest rates. As the handout that you have and the chart that is here illustrate, the crosshatched section shows high real interest rates prevailing throughout the 1980s. High real interest rates are the rates that are in excess of the 3 percent standard above the inflation rate. So, if you take the nominal rate or market rate, subtract the inflation rate, you end up with the excessive amount. And so, our goal is to introduce a financing vehicle that will return the government's financing to a 3 percent real rate and avoid the additional financing cost.

The second chart shows a comparison of the current long-term government bond yield of 9½ percent. And to illustrate the nominal rate of interest, we have shown the 3 percent real rate which bondholders require, the current 4 percent inflation, and then the 2½ percent inflation premium that reflects the uncertainty in the bond markets currently over the prospects of inflation.

Against that, we would offer our proposal which would again have the 3 percent real rate, combined with a projected inflation rate of 4 percent against which oil would inflate, for a total rate of return of 7 percent to the bondholder. So, in essence, instead of attempting to have a bond price that a certain amount above inflation and attempting to have a projection of inflation that would be adequate to cover whatever future inflation there would be, we have taken a real rate of return and attached to that an inflation hedge that if, in essence, we miscalculate interest rates, the inflation hedge takes care of that problem.

So, in essence, the government would pay on an annual basis the 3 percent interest to the bondholder. The bondholder would receive along with that the 4 percent or whatever the inflation increase is in the price of oil during that time period. However, the inflation portion of the bond would not be payable until the bond is called or matured some 30 years out. So, there is a present value savings to the government. Whereas the total financing costs would be 7 percent, 4 percent of that payment to the bondholder wouldn't occur for some 30 years out. So, on an accrual basis, you would save a significant amount.

In terms of the desirability of oil as an inflation hedge, if I could have the next chart, gold and oil have manifested similar price movement characteristics for quite some time. The chart goes back to 1964. One can see that in 1972–73, when the gold window was closed, the OPEC incident occurred and so forth, gold moved up at the same time. And while it doesn't move in lock step, it nonetheless moves in a similar fashion. So, it is our contention that if gold is an appropriate inflation hedge, that oil as an alternative would be suitable to the bondholder.

And so, again, we are looking at a total rate of return to the bondholder of the 3 percent real rate, plus the inflation hedge, and providing substantially less cost to the government.

The final chart that I have shows the financing cost comparisons between traditional current long-term Treasury bonds and the proposed convertible oil bond. At the top of the chart, you have the specific bond issues. We use current interest rates to illustrate our point. If one were to take the—and we just use 540 million barrels in the reserve—finance that with current long-term Treasury bonds of 9½ percent, it would produce an annual payment of $923 million in interest.

Senator BRADLEY. How much at what fill rate?

Mr. LEONARD. At 9½ percent. That is just refinancing existing oil.

Senator BRADLEY. I see.

Mr. LEONARD. So, if you look at current carrying costs in terms of the opportunity cost of oil on the reserve, what it is costing you to have it there, and then if you looked at additions to the——

Senator BRADLEY. You mean what would have happened had you done this. Are you saying refinancing the whole reserve?

Mr. LEONARD. Yes. We are recommending that the whole reserve be refinanced, existing oil as well as additional oil acquisitions.

Obviously, the majority of the purchases have occurred in the late 1970's and early 1980's when rates have been substantially higher than the 9½ percent that we have used. But taking it from this point on and moving forward, we are using the 9½ percent as a carrying cost for the oil currently in the reserve.

If one then filled the reserve at 100,000 barrels a day, stepped it up to that rate, it would be full in 1993. And using CBO's projections for interest rates for the respective years, you would get a total financing cost of $1.288 billion per year using long-term Treasury bonds.

Now, we have gone on to apply compound interest factors to this. And in utilizing compound interest, the total financing would approach $187 billion over the 30 years.

Now, in comparison, we would offer the convertible oil bonds.

Senator BRADLEY. Before you go on, go through this one more time.

Mr. LEONARD. Certainly.

Senator BRADLEY. How do you get $187 billion?

Mr. LEONARD. By taking each specific bond issue and applying the Treasury bond interest rate for that particular issue——

Senator BRADLEY. Each bond issue.

Mr. LEONARD. Correct. We are assuming, for instance—let's just use 1988—that 36,500,000 barrels of oil would be purchased to put in the reserve. A bond issue at $18 a barrel would be $657 million at 9½ half percent interest, which is the CBO projection for 1988. It would produce a payment of $62 million. That $62 million payment on a compound basis would equal $9 billion over the 30 years that it would be in existence.

Senator BRADLEY. Could we back up just a little bit? I want to try to think this through. We own the oil now in the reserve.

Mr. LEONARD. Correct.

Senator BRADLEY. We would be selling the oil to the bondholders?

Mr. LEONARD. No, sir. Oil is used as an index against these bonds. And when you issue the bonds, it is the full faith and credit of the government. So, the government still maintains ownership of the oil. So, oil becomes just an index for the bonds.

Senator BRADLEY. And people would buy the bonds?

Mr. LEONARD. They would buy the bonds because they are guaranteed a real rate of 3 percent. They don't have to make interest rate projections to the future, guesstimating what inflation will be, what other events will be. They know that if they get a good inflation hedge, along with the guaranteed real rate of 3 percent, that they will have a decent rate of return.

Senator BRADLEY. And the government would take the proceeds of the bond sales and do what? Buy more oil?

Mr. LEONARD. Correct. Buy more oil to fill it to whatever level you anticipate going to. That, however, if we refinanced existing oil along with bought additional oil, would still leave a substantial amount, close to $10 billion that would be returned to the Treasury. So, instead of issuing additional 30-year Treasury bonds at 9½ percent, that refunding for the quarter would be reduced by that amount.

Senator BRADLEY. Excuse me. Go ahead. Have you finished your presentation?

Mr. LEONARD. As far as the oil bonds are concerned, we have assumed a 4 percent inflation rate over a 30-year period. Our studies go back to 1897 in which the average rate over the period has been 3.05 percent. So, we feel that over a long-term period, we are probably going to move from this high inflation rate of the 1980's and obviously this inflationary rate now to a more reasonable level.

But combining both the inflation rate and the 3 percent real rate, you end up with a total financing cost for the oil bonds of approximately $34 billion for a net difference of $153 billion.

[The prepared statement of Messrs. Hummel and Leonard follows:]

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Convertible Oil-Bond Proposal

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A Proposal for Reducing the Financing Costs
Associated with the Strategic Petroleum Reserve

Submitted to:

Members of the Committee on
Energy and Natural Resources
United States Senate
Washington, D.C.

By
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Proposal Summary

In view of the high real interest rates that have prevailed throughout the 1980's, it is proposed that the government issue Convertible Oil-Bonds to both refinance the oil currently in the Strategic Petroleum Reserve (S.P.R.) and purchase additional oil to fill it to the approved 750-million barrel capacity.

Our research indicates that Convertible Oil Bonds could be priced at par to yield 3% if the bond conversion price is near the market price of oil at the time of issuance and the maturity of the bonds is around 30-years. The conversion privilege means that each bond could be converted into the dollar-equivalent of "x" barrels of oil. The Convertible Oil-Bonds would have a value at maturity of at least par ($1,000) if the price of oil is less than the conversion price, or higher, if the price of oil exceeds the conversion price. Throughout the life of the bonds the government would pay the bondholder 3% interest.

Since the bondholder could potentially receive more than 3% interest if the price of oil rises above the conversion price, possible oil appreciation could be included in the total financing estimates. The Consumer Price Index averaged 3.05% inflation from 1897 to 1987. Using a forward-averaging formula with thirty-year time blocks, the average inflation rate was 2.58%. Therefore, an oil inflation rate of 4.0% over the next thirty years is conservative if the price of oil continues to follow the Consumer Price Index.

The 3% coupon interest rate is a real rate of return equal to the historic norm for government securities. It is made possible by protecting the bondholders' principal with the conversion privilege rather than trying to do so with a higher interest rate.

The market's acceptance of this low interest rate was recently confirmed by a million-ounce gold loan to Newmont Mining Corp. which raised approximately $450-million with a 2 1/2% coupon rate (with a five year term) agreeing to repay the loan in the dollar equivalent of a million ounces of gold

at the maturity of the loan. While the underlying commodity is gold rather than oil the comparison is valid because the two commodities have manifested similar price-movement characteristics.

The difference between the two financing vehicles is staggering. Conventional Treasury bonds <u>will</u> cost the government over $186-billion over the next thirty years, while the Convertible Oil-Bonds will total approximately $33-billion over the same time span for a savings of $153-billion! The only scenario under which Convertible Oil-Bonds could be more expensive than conventional Treasury bonds is for oil to appreciate to more than $225/bbl in thirty years. For that to occur oil would have to inflate at a rate of 8.75% year-in-and-year-out for thirty years-- an unprecedented rate for that length of time. The highest rate of inflation for any thirty-year period since 1897 has been 4.8%.

The essence of the Convertible Oil-Bond approach is to match a long-term asset with an appropriate long-term liability. Clearly, the current method must be replaced with a more innovative form of financing.

Convertible Oil Bond Proposal

The following is a proposal for reducing the interest carrying-cost associated with the Strategic Petroleum Reserve (S.P.R.) by $872-million annually or $153-billion over thirty years. Briefly stated, it is proposed that the government issue 3% convertible bonds backed by the oil in the Reserve. These bonds would be used to both refinance existing oil in the S.P.R. and buy additional amounts to fill it to the approved 750-million barrels.

I. The Problem: High Financing Costs-- High Real Interest Rates

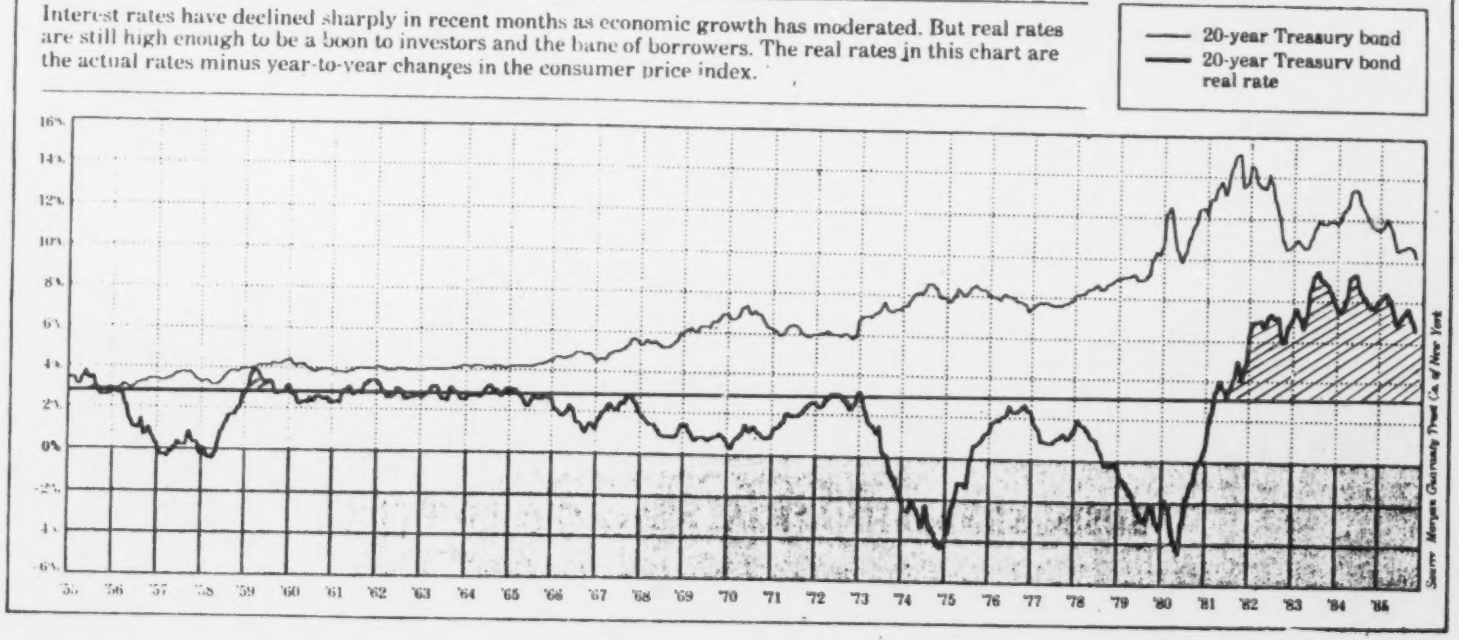
The primary reason a new financing vehicle must be developed is the impact of high real interest rates since 1973. The noted economist, Paul W. McCrakin, stated in a recent Wall Street Journal article that "The "real rate (the rate on 10-year Treasury obligations minus the inflation rate) in the 1980's has averaged about 6%-- far above earlier periods and far above what the economy on a continuing basis can validate."(December 23, 1987)

As the chart on the following page illustrates, an average real rate of approximately 3% held fairly constant until 1973 when the U.S. dollar was uncoupled from gold: when Bretton Woods was abandoned and when the consequent price of oil readjusted to its historic ratio to the free-market price of gold. Since 1981, however, the real rate of return jumped to 9% in 1983 and 1984, and has since fallen to between 5 1/2%-6% currently-- still nearly double the historic norm.

Numerous studies have also concluded that, over time, investors have required a real rate of return of approximately 3%. Dr. Irving Fisher published his findings in 1930 while Valueline Investment Services did a similar study in 1982.

After Adjusting for Inflation, Interest Rates Remain Near Record Highs

Interest rates have declined sharply in recent months as economic growth has moderated. But real rates are still high enough to be a boon to investors and the bane of borrowers. The real rates in this chart are the actual rates minus year-to-year changes in the consumer price index.



Many reasons are being given in the financial press for these high real interest rates which do not need to be examined herein, but their reality and impact must be recognized. The goal of this proposal is to help the government develop a financial instrument that will enable it to return to the time-tested real rate of 3%.

II. The Solution: 3% Convertible Oil Bonds

Oil Bonds-- A Tested Concept

The type of bond being proposed is similar to a F.N.M.A which is backed by residential mortgages, except that this one would be backed by oil instead. Oil-backed bonds were issued by Pemex of Mexico in 1981 and Standard Oil of the U.S. in 1986. The concept has also been applied to an issue of silver-backed bonds by Sunshine Mines, Inc.

Oil Bond Characteristics:

Convertibility--The Inflation Hedge

The convertibility feature makes them very attractive to investors because many believe that, with the inflation rate having fallen from 14% to 2% and long-term Treasury Bond yields from 14% to 7.3%, both have begun a cyclical rise. The convertibility feature means that investors do not have to be concerned about buying bonds at the bottom of the interest rate cycle thereby risking the erosion of their principal due to rising interest rates.

By making the oil-backed bond convertible into the dollar equivalent of oil it would have both inflation and deflation protection. It would have deflation protection because it would be a government bond with a stated par value and maturity date. On the other hand, it would have inflation protection because it could appreciate with the price of oil, assuming the price of oil follows the inflation rate in the future.

Currently, investors buy gold for inflation protection and conventional Treasury bonds for deflation protection. With the oil-backed bond the investor can have the protection of both a bond and gold (black gold). When one considers that

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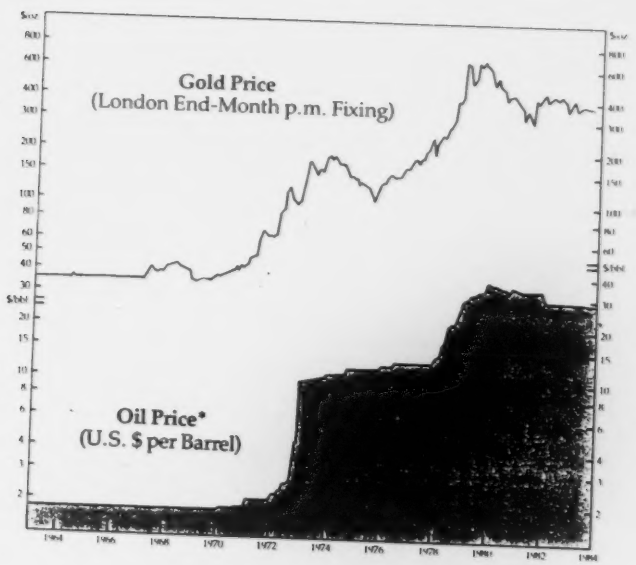
the recent Golden Eagle coin was over subscribed, and of course, bears no interest for holding the coin, the demand for the oil-backed bonds should exceed the supply provided by the S.P.R.

Oil is an Inflation Hedge

The following chart illustrates the historical relationship between the price of gold and the price of oil. The chart makes it clear that if gold is an inflation hedge then oil, which has manifested similar price-movement characteristics, is an equal to gold as an inflation hedge.



Interest Rate: 3%

By making the bond convertible into the dollar equivalent of oil it gains inherent inflation protection thereby removing the current inflation premium being paid in the form of additional interest. Our research indicates that if the conversion price of the bond is close to the market price of oil at the time of issuance that the bonds could be priced at par to yield 3.0%. It should be noted that the interest rate is a function of the conversion price of the bond rather than simply the price of oil. For any given price of oil there is a conversion price that will enable the bond to yield 3.0%. Consequently, if the inflation premium can be removed the government can save that amount in annual interest, currently between 5.5%- 6.0% when compared to a 9 1/2% long-term Treasury bond.

Newmont Mining Corp., the U.S.'s largest gold producer, received a million-ounce gold loan in February 1988 from a consortium of banks led by Bank of Nova Scotia. It received a five year loan for approximately $450-million (based on the then current $450/oz market price for gold) at an interest rate of 2.5%. Since 1985 about $2-billion of gold loan financing has been arranged for gold mining companies. Gold loans are an attractive form of debt because interest rates have ranged between 1.5% and 3.0%.

Other "real rate" issues include: Franklin Savings Association where $170-million of 20-year, C.P.I. indexed bonds were placed. The bonds were priced to yield 7.50%, and with 1987's inflation rate of 4.4%, a real rate of 3.1% was achieved. This 7 1/2% variable-rate bond compared to an industry-wide rate of approximately 12% for fixed-rate long-term bonds.

Additionally, Printon Kane Capital Corp. placed $50-million of 10-year, varible-rate bonds for First Federal Savings of Puerto Rico (Assets, $1.5-billion). These real-rate, collateralized mortgage bonds yielded 3.70% plus the C.P.I. index. Clearly, real-rate issues are an accepted form of financing whose net real-rate is determined by the size and financial strength of the issuer.

Additional "Interest": Oil Appreciation

Since the bondholder could potentially receive more than 3% interest if the price of oil rises above the conversion price, potential oil appreciation could be included in the total financing estimates for the convertible oil bonds.

The 1988 C.B.O. Treasury bond interest forecast is 9 1/2%, while the Convertible Oil Bond interest rate is 3% producing a 6 1/2% spread. The spread would represent total interest savings between the two bonds if the price of oil is less than the conversion price at maturity. The savings spread would be reduced by the inflation of oil prices. Consequently, what is a reasonable inflation forecast?

The chart Appendix A, page 13 lists the actual Consumer Price Index inflation rates, by year, from 1897 to 1987. Columns 3, 4 and 5 project forward, inflation rates for ten-year, twenty-year and thirty-year periods, respectively, based on actual historic rates. The 10-year forward-averaging column produced fifteen 10-year periods (over a span of eighty years) in which inflation averaged 6 1/2% or more, with an average inflation rate of 3.05%; neither the 20-year nor the 30-year forward-averaging periods had blocks of time where inflation averaged 6 1/2%, but rather averaged 2.83% and 2.58%, respectively. The 30-year periods did not have a period that exceeded 4.8%. For purposes of financial projection, an inflation rate of 4% is a reasonable estimate.

Bond Term and Call Feature

The longer the term of the bond the better because, over time, the forces of inflation and deflation tend to even out with a bias toward an inflation of 3% annually. Therefore, the maturity of the bonds should be around thirty years.

The convertible oil bonds would have a call feature which gives the government the right to retire the bonds if the oil is withdrawn from the S.P.R. This provision would require that when oil is taken out of the Reserve, the money from the sale go to the Treasury and then be used to redeem the bonds at face value plus any appreciated oil value.

III. Government Accounting Practices

Based on government accounting practices this approach to financing the S.P.R. would credit the U.S. Treasury for nearly $10-billion in proceeds from the initial refinancing of oil currently in the Reserve. These proceeds will significantly reduce the quarterly refunding requirements for the ensuing year.

Budget Accruals

The Congressional Budget Office issued an opinion regarding the treatment of the potential annual appreciation of the bonds stating that it would have to be included in the Federal Budget in the year incurred to reflect the increased future liability, even though the actual payment to the bondholder would not be made until the bonds were either called or reached maturity. The C.B.O. did not, however, know how it would treat possible oil declines as occurred in 1986. With this inconsistency, it is entirely possible that the bonds could reach maturity having experienced some periods of inflation and deflation, but on a net basis have no change in the bonds value nor increase in the government's liability at maturity. This could result in interest having been expensed for the periods of inflation, needlessly, and distort the actual interest expenses.

Present Value Treatment of Accruals

Even so, the opinion will still probably require that the appreciation of the bonds be treated on an accrual basis. But, with the actual cash payments to the bondholder being paid when the bonds mature (as much as thirty years in the future), the present value savings derived from not having to make the payments until the bonds mature must be factored into the calculations.

For example, the oil accrual for 1991 (Appendix B, page 14) lists a $171.5-million increase, but that issue of bonds will not mature for another twenty-seven years. With an assumed inflation rate of 4% over the term of the bonds the present value of that payment would require that only $27.5-million be expended in FY1991. The net result, given assumptions based on current C.B.O. forecasts regarding inflation, the

price of oil and interest rates, would be that there would be no accruals during the first three years during which time over $3-billion would be cut out of the budget through pure "interest" savings. Even when the accruals do become a factor, the cumulative total of oil bond interest and oil appreciation should be less than what is currently being spent on conventional Treasury bond interest. Therefore, the issue of accruals, though inconsistent, is not a major issue.

IV. Total Interest Savings: $153-Billion

The interest cost projections on page 11 compare costs of conventional long-term Treasury bonds to Convertible Oil Bonds. The illustration utilizes estimates from the Congressional Budget Office regarding inflation rates, interest rates and the price of oil. It was also assumed that the additions to the S.P.R. would be at a rate of 100,000 bbls/day which would fill the S.P.R. in less than six years.

The difference between the two financing vehicles is staggering. Conventional Treasury bonds <u>will</u> cost the government over $186-billion over the next thirty years, while the Convertible Oil Bonds will total approximately $34-billion over the same time-span producing a savings of $153-billion! The only scenario under which Convertible Oil Bonds could be as, or more, expensive than conventional Treasury bonds is if oil inflates to more than $225/bbl (in constant dollars) in thirty years. For that to be possible, oil would have to increase at a rate of 8.75% year-in-and-year-out for thirty years-- an unprecedented rate for that length of time. As noted above, the highest rate of inflation for any thirty-year period since 1897 has been 4.8%.

Fiscal Responsibility

It should also be noted, however, that the above calculations include the appreciation of oil as an additional interest expense because the treatment is considered necessary by some. Others consider the inclusion of this element to be unnecessary because the oil in the S.P.R. was purchased with borrowed money that must still be repaid. Furthermore, the average purchase price of oil currently in the S.P.R. was $25/bbl, and with the current market price significantly

FINANCING COST COMPARISONS
Conventional Treasury Bonds vs. Convertible Oil Bonds

CONVENTIONAL TREASURY BOND PROJECTIONS

Year of Bond Issue	Price of Oil	Bbls of Oil Purchased	Bond Issue	Interest Rate	Annual Interest Payment	Compound Interest Payments to Year 2017
Refinance Existing S.P.R.						
1988	$18.00	540,000,000.00	$9,720,000,000	9.5%	$923,400,000	$131,221,439,517
New Additions to S.P.R.						
1988	$18.00	36,500,000.00	$657,000,000	9.5%	$62,415,000	$9,342,745,449
1989	18.72	36,500,000.00	683,280,000	9.7%	66,278,160	10,301,656,129
1990	19.47	36,500,000.00	710,611,200	9.2%	65,376,230	9,250,578,233
1991	20.25	36,500,000.00	739,035,648	8.6%	63,557,066	8,042,291,257
1992	21.06	36,500,000.00	768,597,074	8.0%	61,487,766	6,965,531,567
1993	21.90	27,500,000.00	602,243,187	7.6%	45,770,482	4,819,513,645
		750,000,000	$13,880,767,109		$1,288,284,704	$186,943,755,797

CONVERTIBLE OIL BOND PROJECTIONS

Year of Bond Issue	Price of Oil	Bbls of Oil Purchased	Bond Issue	Interest Rate	Annual Interest Payment	Compound Interest Payments to Year 2017
Refinance Existing S.P.R.						
1988	$18.00	540,000,000.00	$9,720,000,000	3.0%	$291,600,000	$13,872,991,220
New Additions to S.P.R.						
1988	$18.00	36,500,000.00	$657,000,000	3.0%	$19,710,000	$937,711,444
1989	18.72	36,500,000.00	683,280,000	3.0%	20,498,400	975,219,901
1990	19.47	36,500,000.00	710,611,200	3.0%	21,318,336	1,014,228,697
1991	20.25	36,500,000.00	739,035,648	3.0%	22,171,069	1,054,797,845
1992	21.06	36,500,000.00	768,597,074	3.0%	23,057,912	1,096,989,759
1993	21.90	27,500,000.00	602,243,187	3.0%	18,067,296	859,559,099
		750,000,000	$13,880,767,109		$416,423,013	$19,811,497,965
Appreciation of Oil Bonds above conversion price (See APPENDIX B, pg. 14)						14,026,208,233
						$33,837,706,198
Convertible Oil Bond Interest Savings over 30 years						$153,106,049,598

Assumptions:
* C.B.O. inflation estimate: 4%.
* Conversion price of bonds: $20/bbl.
* C.B.O. oil price estimate for 1988-93.
* C.B.O. Interest rate estimate for conventional long term Treasury bonds, 1988-93.
* Compound interest rate is the Treasury bond interest rate for that year. Compound rate for oil bonds is 3%.
* See APPENDIX C, pg. 15 for discussion on compound interest.

less, the government essentially has no equity in the Reserve. While it does have ownership it does not have equity. Consequently, a truer perspective is gained if the annual interest expense is viewed as an oil "rental" expense.

With this view, the government essentially has two choices. It can either "rent" the oil for thirty years for $187-billion and retain an option for the possible appreciation of the oil, or, it can "rent" the oil for $20-billion and forgo the potential oil appreciation realizing that the $167-billion difference in cost would require oil to appreciate to $225/bbl just to have the current approach with conventional Treasury bonds breakeven with Convertible Oil Bonds! One must recognize, however, that the government does not make money on the sale of appreciated oil because it must re-enter the oil market to replace that which was withdrawn, and do so at near the same high price.

Conclusion

The essence of our approach is to match a long-term asset with an appropriate long-term liability. Clearly, the current method must be replaced with a more innovative form of financing. While this solution is innovative, it is nonetheless sound and must be enacted soon. Each month's delay costs the government over $70-million. Given the uniqueness of the S.P.R. it seems like this is an ideal solution.

APPENDIX A

CHANGES IN THE CONSUMER PRICE INDEX: 1897-1988

YEAR	CPI	10-Year Forward Average	20-Year Forward Average	30-Year Forward Average
1897	0.00	0.79	1.38	2.72
1898	0.00	1.16	2.25	2.66
1899	0.00	0.80	3.12	2.61
1900	0.00	0.80	3.86	2.61
1901	0.00	1.17	4.66	2.53
1902	4.00	1.17	4.12	2.23
1903	3.85	1.13	3.61	1.76
1904	0.00	0.98	3.50	1.46
1905	0.00	1.12	3.51	1.57
1906	0.00	1.21	3.64	1.65
1907	3.70	1.97	3.69	1.69
1908	(3.57)	3.34	3.41	1.68
1909	0.00	5.45	3.52	1.74
1910	3.70	6.93	3.52	1.69
1911	0.00	8.14	3.21	1.60
1912	3.57	7.08	2.77	1.77
1913	2.41	6.09	2.07	2.00
1914	1.35	6.02	1.70	2.13
1915	0.97	5.91	1.80	2.14
1916	7.57	6.07	1.87	2.19
1917	17.43	5.40	1.54	2.22
1918	17.45	3.47	0.85	2.12
1919	14.86	1.59	(0.11)	1.79
1920	15.83	0.11	(0.93)	1.26
1921	(10.67)	(1.73)	(1.67)	0.77
1922	(6.34)	(1.54)	(0.89)	1.39
1923	1.79	(1.94)	(0.04)	1.67
1924	0.20	(2.63)	0.18	1.64
1925	2.54	(2.32)	0.26	1.65
1926	0.95	(2.32)	0.24	1.58
1927	(1.87)	(2.32)	0.62	1.59
1928	(1.35)	(1.77)	1.44	1.78
1929	0.00	(1.82)	1.89	1.91
1930	(2.53)	(1.96)	1.84	1.94
1931	(8.80)	(1.61)	2.02	2.08
1932	(10.31)	(0.23)	2.85	2.40
1933	(5.13)	1.86	3.48	2.78
1934	3.35	2.99	3.77	3.00
1935	2.49	2.83	3.63	2.93
1936	0.97	2.81	3.52	2.90
1937	3.61	3.57	3.55	2.97
1938	(1.86)	4.64	3.55	2.94
1939	(1.42)	5.60	3.78	3.14
1940	0.96	5.65	3.89	3.37
1941	5.00	5.65	3.92	3.53
1942	10.66	5.94	3.72	3.51
1943	6.15	5.10	3.25	3.27
1944	1.74	4.56	3.00	3.27
1945	2.28	4.43	2.98	3.58
1946	8.54	4.24	2.95	3.80
1947	14.36	3.54	2.66	3.71
1948	7.77	2.46	2.09	3.45
1949	(0.97)	1.95	1.91	3.45
1950	0.98	2.13	2.23	3.85
1951	7.91	2.19	2.48	4.27
1952	2.19	1.50	2.30	4.35
1953	0.75	1.40	2.35	4.48
1954	0.50	1.44	2.63	4.57
1955	0.37	1.52	3.15	4.69
1956	1.50	1.66	3.59	4.80
1957	3.56	1.79	3.80	
1958	2.73	1.73	3.95	
1959	0.81	1.87	4.19	
1960	1.60	2.33	4.72	
1961	1.01	2.76	5.31	
1962	1.12	3.09	5.78	
1963	1.21	3.31	6.03	
1964	1.31	3.81	6.13	
1965	1.72	4.78	6.28	
1966	2.86	5.52	6.37	
1967	2.88	5.81		
1968	4.20	6.17		
1969	5.37	6.51		
1970	5.92	7.11		
1971	4.30	7.86		
1972	3.30	8.47		
1973	6.23	8.75		
1974	10.97	8.45		
1975	9.14	7.78		
1976	5.77	7.22		
1977	6.45			
1978	7.66			
1979	11.31			
1980	13.47			
1981	10.37			
1982	6.13			
1983	3.22			
1984	4.26			
1985	3.57			
1986	1.10			
1987	4.40			
Average Inflation Rates For Each Category		3.05	3.01	2.83	2.58

APPENDIX B

ANNUAL BUDGET ACCRUALS RESULTING FROM OIL PRICE INCREASES
(Additional Financing Costs)

Year of Issue	Years to Maturity	Price of Oil	Annual Price Increase	Barrels of Oil in Strategic Petroleum Reserve	Total Annual Appreciation	ANNUAL BUDGET ACCURAL (Present Value of Future Payment to Bondholder)
1988	30	$18.00		576,500,000		
1989	29	18.72	$0.72	613,000,000		
1990	28	19.47	0.75	649,500,000		
1991	27	20.25	0.78	686,000,000	$171,500,000	$27,599,558
1992	26	21.06	0.81	722,500,000	585,154,253	100,760,925
1993	25	21.90	0.84	750,000,000	631,723,622	116,394,558
1994	24	22.78	0.88	750,000,000	656,992,567	129,523,864
1995	23	23.69	0.91	750,000,000	683,272,270	144,134,156
1996	22	24.63	0.95	750,000,000	710,603,161	160,392,489
1997	21	25.62	0.99	750,000,000	739,027,287	178,484,761
1998	20	26.64	1.02	750,000,000	768,588,379	198,617,843
1999	19	27.71	1.07	750,000,000	799,331,914	221,021,935
2000	18	28.82	1.11	750,000,000	831,305,190	245,953,209
2001	17	29.97	1.15	750,000,000	864,557,398	273,696,731
2002	16	31.17	1.20	750,000,000	899,139,694	304,569,723
2003	15	32.42	1.25	750,000,000	935,105,282	338,925,187
2004	14	33.71	1.30	750,000,000	972,509,493	377,155,948
2005	13	35.06	1.35	750,000,000	1,011,409,873	419,699,140
2006	12	36.46	1.40	750,000,000	1,051,866,268	467,041,203
2007	11	37.92	1.46	750,000,000	1,093,940,918	519,723,450
2008	10	39.44	1.52	750,000,000	1,137,698,555	578,348,255
2009	9	41.02	1.58	750,000,000	1,183,206,497	643,585,938
2010	8	42.66	1.64	750,000,000	1,230,534,757	716,182,432
2011	7	44.36	1.71	750,000,000	1,279,756,147	796,967,810
2012	6	46.14	1.77	750,000,000	1,330,946,393	886,865,779
2013	5	47.99	1.85	750,000,000	1,384,184,249	986,904,239
2014	4	49.90	1.92	750,000,000	1,439,551,619	1,098,227,038
2015	3	51.90	2.00	750,000,000	1,497,133,684	1,222,107,048
2016	2	53.98	2.08	750,000,000	1,557,019,031	1,359,960,722
2017	1	56.14	2.16	750,000,000	1,619,299,792	1,513,364,292
					$27,065,358,294	$14,026,208,233

Assumptions:
* Conversion price of $20/bbl.
* First year of budget accural is 1991. The annual per-barrel increment is the amount above $20/bbl.
* An inflation rate of 4.0% is utilized for oil price inflation (C.B.O.'s estimate).
* Present value discount rate is 7% (3% real rate plus 4% inflation rate).
* 30-year maturity assumed for all bonds issued.

APPENDIX C

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COMPOUND INTEREST

AS IT EFFECTS

U. S. GOVERNMENT SECURITIES

An assumption underlying the Convertible Oil Bond Proposal is the application of the principle of "compound interest" to the projection of total interest expense on U. S. Government securities rather than that of "simple interest." This is a significant issue because total interest expense associated with the Strategic Petroleum Reserve over the next thirty years, recognizing simple interest, is "only" $37.8-billion versus $187-billion if interest on the debt is compounding. At stake is whether Convertible Oil Bonds will save $3.9-billion or $153-billion over the next thirty years. We firmly believe that compound interest represents the only responsible way to view the government's total interest obligation for the future.

Compound interest results when interest is paid on interest. For example, if interest is compounded annually, then total interest for the second year is "simple interest" on the sum of the first year's interest plus the principle. Year three, then, is the "simple interest" on the sum of the first and second years' interest plus the principle, etc., etc.

This mechanism can be created in one of two ways. A security can either be issued that internally yields compound interest; or, a "simple interest" security can be transformed into a "compound interest" security by financing the payment of that simple interest with the issuance of additional "simple interest" bonds each year the interest is due.

It is the latter case that applies to the calculation of total interest expense by the U.S. government since it issues additional debt securities annually to pay interest on the national debt. Total interest expense on the nation's $2-trillion debt will be approximately $180-billion in FY1988 versus a projected deficit of $157-billion (A deficit results when government expenditures exceed tax receipts which is

then financed with additional debt.). This creates an interest-on-interest situation which will persist so long as the government operates under a budget deficit. This being the case, how long is it likely that the government will run in the red?

With the passage of the Gramm-Rudman-Hollings budget balancing law it would appear that budget deficits are "living on borrowed time." However, when one examines other aspects of the budgeting process one discovers that actual budget deficits are reduced by surpluses from the Social Security Trust Fund. This means that the FY1988 budget deficit of $157-billion would have been $194-billion were it not for the $37-billion surplus in Social Security.

Recent projections estimate that Social Security Trust Fund assets will increase from $254-billion currently to $12-trillion in 2030. Furthermore, by law, Trust Fund assets must be invested entirely in government bonds. This creates an interesting dilemma-- Social Security surpluses could actually mandate Federal budget deficits because additional bonds can only be issued if there is a budget deficit and additional bonds must be issued because of the Trust Fund surpluses! While on a net basis the overall budget may be balanced in the foreseeable future, there will still be an internal deficit requiring the issuance of additional bonds earmarked for purchase by the Social Security Trust Fund for at least forty years to come.

In view of the budget deficit problems, we believe that compound interest not only can but must be utilized in calculating total interest expense.

APPENDIX D
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QUESTIONS & ANSWERS

1. Historically speaking, what interest rate has the U.S. government paid on long-term Treasury bonds?

Over the past forty years the U.S. government has paid 3% interest on a "real rate" basis. The "real rate" is the nominal interest rate (or market interest rate) less the inflation rate. The difference between the nominal rate and the inflation rate is the primary consideration of government bond investors.

2. What has the range of real interest rates been during the decade of the 1980's?

The real rate on long-term government bonds has been as high as 9% in 1983 but is currently 5.5%.

3. What consequences has the government suffered as a result of these high real interest rates?

The third largest budget item is interest on the national debt, currently $180-billion. Therefore, the government has been paying bondholders significantly more for the use of their money.

4. Since the inflation rate greatly influences the government's cost of funds (interest) what has the average inflation rate been over the past century?

Since 1897 the average inflation rate has been 3.05.

5. What are the characteristics of the proposed Convertible Oil Bond?

The Convertible Oil Bond would have a stated par value and be convertible into the dollar value of a specified number of barrels of oil. It would have a conversion price slightly higher than the price oil of at the date of issuance of the bonds. The bonds would pay 3% interest and could have staggered maturity dates between 25 and 30 years.

6. How does the Convertible Oil Bond work?

The oil bond can be converted from par value into the value of a specified number of barrels of oil. For example, if, on the day that the oil bonds are issued oil is selling for $20/bbl, then a $1,000 bond would be worth either par value ($1,000) or fifty barrels of oil. However, if the price of oil later rose to $30/bbl, then the bond would appreciate by 50% (50 bbls x $30/bbl less $1,000 = $500. $500 divided by $1,000 = 50%). On the other hand, if the price of oil was to decline to $15/bbl then the bondholder would not convert but would accept the par value.

7. Why would anyone buy a bond which yields only 3% interest when current long-term Treasury bond yields are over 9%?

The investor that believes there is a higher probability for inflation in the future, rather than stable prices or deflation, would buy the convertible oil bonds. Also, a major user of petroleum products could use these bonds to hedge or protect against increases in the price of oil. The essence of the bond resides in its convertibility feature. Therefore, an investor would be willing to accept 3% interest if he could receive an additional amount to cover inflation, ie., from an inflation hedge like oil.

8. How effective has oil been as an inflation hedge?

Oil has maintained a fairly constant relationship with gold. Oil made its dramatic price increase when gold rose in the early 1970's. It wasn't until after 1971 that the gold window closed, price controls failed and inflation began to accelerate. Subsequently, the price of gold rose and the price of oil was maneuvered up to its historical relationship

with the price of gold. It would appear that as long as gold is an effective inflation hedge that oil will be likewise.

9. Is the 3% annual interest payment, along with the return of the investor's principal, the total obligation of the government to the bondholder?

No, the government is agreeing to pay the convertible oil bond investor 3% interest plus an additional bonus if there is any appreciation in the price of oil.

10. When can the bonds be converted?

The bonds can be converted at the occurrence of one of two events. First, if there is a draw-down of the Reserve then bonds outstanding would be eligible for conversion. If a partial draw-down occurs, bonds would be eligible for conversion on a lottery basis based upon the number of barrels withdrawn. Should the Reserve not be totally withdrawn at the maturity dates of the bonds the remaining bonds would be eligible for conversion at maturity.

11. If the bonds are converted, what market price standard of value will be utilized to determine the value of the oil?

We would suggest the West Texas Intermediate Crude Oil Futures Contract since it is the most actively traded crude oil contract in the domestic commodities market. As such it has become an indicator for world crude oil prices generally.

12. Why stagger the maturity dates of the oil bonds?

The refunding efforts of the oil bonds should be done in multiple years so as to maintain an orderly market in the bonds. This would also tend to protect the government from being forced to reissue the bonds in undesirable market conditions.

13. How would the government pay off the bondholders either at a draw-down or at maturity?

In the event of a draw-down of the Reserve the government would sell the SPR oil to a refiner, the proceeds of which would be distributed to bondholders. A new issue of oil

bonds would then be sold to replace the oil withdrawn. Should a draw-down not occur by the time the bonds reach maturity then new oil bonds would be placed to retire the original issue.

14. How would the bond proceeds be used?

Using the C.B.O. estimate of $19/bbl, the 750-million barrels in the S.P.R. would raise over $14-billion. $4-billion would be used to purchase the remaining 210-million bbls needed to fill the Reserve to capacity, while the remaining $10-billion would be returned to the Treasury which would reduce the quarterly refunding efforts.

15. How much interest associated with the SPR could be saved if the entire 750-million bbl reserve was financed with oil bonds?

Conventional Treasury bonds will cost the government over $186-billion over the next thirty years; while the Convertible Oil Bonds should total no more than $34-billion over the same time-span thereby producing a savings of $153-billion, assuming a bond conversion price of $20/bbl.

16. Since the government does not pay compound interest is it valid to project interest expenses reflecting such?

The interest projections utilized in question 15 above utilize annual compound interest. While the government pays simple interest annually it in effect is paying compound interest if it must finance the current year's interest expense with additional bonds. Beyond that, annual compound interest reflects the basic time-value of money.

17. What impact does this proposal have on the budget?

All oil purchases, regardless of how they are financed whether by Treasury bonds or by oil bonds, are a capital expense and as such would be itemized in the budget. The budget savings, over $800-million annually, relate to the on-going financing costs.

18. Convertible Oil Bonds would be as expensive as the current method of financing the SPR with Treasury bonds if the price of oil were to rise dramatically. To what price would oil have to inflate for this to occur?

Convertible Oil Bonds would be as, or more, expensive than conventional Treasury bonds only if oil inflates to more than $225/bbl (in constant dollars) over the next thirty years. For that to occur an inflation rate of nearly 8.75% would be required year-in-and-year-out for thirty years. That has never happened. The highest inflation rate over any thirty year period since 1897 has been 4.8%. AS long as the price of oil is less than $225/bbl in thirty years Convertible Oil Bonds will save money.

19. Who are the potential purchasers of the oil bonds?

It is believed that major oil users and institutions could account for the majority of the purchases while sophisticated, individual investors would account for the balance.

20. Who would own the oil in the S.P.R.?

The oil in the S.P.R. would still be owned by the U.S. government.

Senator BRADLEY. Well, this is an intriguing idea. Let me see if I have it.

We have existing oil in stockpile. And the government takes that oil. It issues debt, just like it now issues every month or every week, or however, but it issues debt at an interest rate of 3 percent.

Mr. LEONARD. Yes, sir.

Senator BRADLEY. So, it pays 3 percent interest. The person who buys that—the reason they would take a 3 percent interest payment is because essentially you have collateralized the debt with the underlying oil?

Mr. LEONARD. Well, it is at least bench marked against it. It could be collateralized depending on how closely you want the oil allied to the bondholder. I think the indexing is the important issue.

Senator BRADLEY. Now, let's say you have a rapid inflation. How does the bondholder cash in on the inflation hedge?

Mr. LEONARD. The secondary market would treat these bonds almost like a commodity where the bond would appreciate with the price of oil. So, in essence, on one side of the bond—let's just say oil was $20 a barrel—that bond would be worth 50 barrels of oil. So, if oil was running above the conversion price, then the bond would appreciate.

Senator BRADLEY. But the proposal says you can't really get the oil for 30 years. You can't convert it at any point.

Mr. LEONARD. Correct.

Senator BRADLEY. Does that make it different than the underlying instruments in the commodities market that will allow you to take possession of the product, gold, soybeans, whatever?

Mr. LEONARD. The market would still price the bonds knowing that they are——

Senator BRADLEY. It would. So, the fact that you couldn't get access to it wouldn't change it.

Mr. LEONARD. No, sir.

I think your comparison with gold is an appropriate one because in holding gold——

Senator BRADLEY. It is not appropriate?

Mr. LEONARD. It is appropriate because in holding gold, you have no return for your investment while you are holding it. You have just got the possibility of——

Senator BRADLEY. Here you have a 3 percent return.

Mr. LEONARD. Here you have a 3 percent.

Senator BRADLEY. Now, what about people who when this subject comes up will inevitably point out, well, but we have lived through a period in the last couple of years where gold prices have been about $430 an ounce, but oil prices have dropped precipitously, so how good a hedge is this?

Mr. LEONARD. Well, obviously, when you use a CPI index, you are using a basket of commodities or other goods. There is no one commodity or good that will track an economy as a whole. We think that with us being an industrial economy that oil is probably as good a single hedge as any one thing.

Senator BRADLEY. What about the danger of, well, if you do this for the SPR, why don't you do it for other things?

Mr. LEONARD. We agree.

Senator BRADLEY. You are here today to argue for commodity-backed——

Mr. HUMMEL. We are here, Mr. Chairman, to try to give the government an opportunity to recoup real cost. And I think in exploring the government's assets and its liabilities in terms of good finance, if you have a long-term asset, you try to match it off against the long-term liability. And because of recent history in the 1970's, because of the fear of inflation, every bondholder, including the government, pays a substantial premium to issue fixed rate debt. And here is an alternative where you have the asset in place and it provides you an opportunity to issue substantially less expensive debt, and you still own the oil. It is still there for the purpose of any type of emergency. So, the government continues to benefit.

So, I think that any financing proposal which, in effect, is benefiting the government and benefiting the government substantially by less cost ought to seriously be considered.

Senator BRADLEY. Who do you think would buy these bonds?

Mr. HUMMEL. I think that you have your normal institutions and individual investors. And I think that you could have a substantial market in major energy users. We think that from their standpoint, it could be a substantial hedge against a rise in energy prices.

Senator BRADLEY. This is probably an unfair question, but do you have any idea how the CBO would score your——

Mr. HUMMEL. Well, we have had some discussions with them. They haven't totally come to us with an answer. They say that as oil prices increased, there would be an accretion or an addition to the budget. And we asked them the question, well, what happens if prices decrease and they didn't give us an answer.

But I think that in supporting this particular document, when you come up with that $14 billion line, as oil prices accrete, much like Social Security, you could put a very small portion in a "designated fund." And as that compounded through time, you have a very, very limited increase in actual funds because again you can use the power of compounding to the government's benefit. And so, if in effect we have to pay off $500 million 30 years from now, you only have to invest $5 million today in order to pay off $500 million 30 years from now.

So, I think that this proposal gives the government the best of all worlds that if the CBO says we want to accrete this cost, then what we do is just set aside a very nominal amount and, in effect, you have an accretion of the interest vis-a-vis the accretion of the oil. So, we don't think whichever way that they come out that it would seriously harm the proposal.

Mr. LEONARD. I would offer as well that if you want to look at this proposal, the oil bond proposal, compared to long-term Treasury bonds, that the only way that our proposal could be more expensive is for oil to inflate at the end of 30 years to $225 a barrel. And for that to occur, inflation would have to be 8¾ percent, year in, year out for 30 years, and that has never happened. If you go back to 1897 and come forward, taking 30 year time blocks, the highest rate is 4.8 percent. So, we would have to move into a period where it would be totally different from past history, that is, year in, year out, uninterrupted 8¾-percent inflation.

Mr. HUMMEL. We think that that is why there is a plus for the bondholder as well as for the government. I mean, we are not doing it for a 3-year period. We are doing it for an approximately 30-year period. And we think that through that period, obviously, there are some pluses and minuses in terms of inflation rates. And as Rande has indicated, the compounding effect here when you are paying 3 percent vis-a-vis 9½ percent is substantial.

Senator BRADLEY. Are you aware of any bond in the marketplace that is backed by commodities?

Mr. HUMMEL. Yes. Well, in the marketplace, no, per se, but in private transactions there have been a number, especially a number of banks have done gold-backed bonds with major gold producers where the interest rate has run anywhere from 1½ to 2½ percent, and the principal is converted into gold at a maturity date of up to 5 years. So, in the private markets this type of transaction has occurred.

In addition, there have been a number of both public—and we have done a private issue—of what we call real rate financing where it is a real rate of 3 to 3½ percent plus the CPI index. And there have been to date two public issues, and we placed one private issue. So, there have been a number of similar types of issues done in the marketplace.

Senator BRADLEY. All right. Do you have anything else to say?

Mr. HUMMEL. We just thank you for your time.

Senator BRADLEY. Thank you very much for your testimony. This is precisely the kind of suggestions that I had hoped the committee would have the benefit to hear. This is a time where innovation is the key. And I appreciate your willingness to come forward and offer this for the committee's consideration. Thank you very much.

Our next witness is Allen Levinson, Managing Director, Bankers Trust Company. And he will be accompanied by Robert L. Cummings, Vice President, Government Financing, Bankers Trust. Gentlemen, welcome to the committee, and please feel free to make any statements that you would like to make at this time.

STATEMENT OF ALLEN J. LEVINSON, MANAGING DIRECTOR, BANKERS TRUST CO., ACCOMPANIED BY ROBERT L. CUMMINGS, VICE PRESIDENT, GOVERNMENT FINANCING

Mr. LEVINSON. Thank you, Mr. Chairman. We do have a formal statement here that we would like to have entered into the record.

Senator BRADLEY. Your full statement will be in the record.

Mr. LEVINSON. Before I begin the presentation, I would like to call to your attention that we will be referring to a series of exhibits which are in our bound copies behind the tab marked "appendix."

We appreciate the opportunity to appear before the committee here today and to discuss with you some of what we believe are the newer financial market innovations which we believe are relevant to financing future oil purchases for the strategic petroleum reserve.

We believe that the concepts that we wish to discuss can provide the Department of Energy with significant budgetary and economic benefits and at the same time preserve the existing procurement

procedures and the strategic objectives of the SPR. In other words, we believe that there is currently an opportunity to increase the fill rate in the SPR, to take advantage of historically low oil prices and to defer all expenditures at a below market interest rate.

By way of background, we initiated our discussions on the SPR with the Energy Department about 1 year ago as part of our objective of putting investment banking expertise to work for the Federal Government. Based upon these discussions, we believe that the public policy objectives of the SPR can be most efficiently met through financial solutions allowing for significantly increased purchases of crude oil for the reserve as rapidly as can be physically handled. Exhibit 1 behind the appendix tab sets forth the constraints that we have assumed any financial plan must meet to reflect the complex environment in which the SPR is currently managed.

We believe that those constraints are: the Department of Energy should maintain ownership of and control over SPR inventories to meet any energy supply emergency. The Energy Department should continue to select suppliers in crude types and to negotiate payment and pricing terms. Oil purchases must be financed in a fashion consistent with current budgetary constraints that this would lead to a need for deferred payment obligations which should be provided on advantageous economic terms, for example, a below-market rate of interest, an up-front cash payment, or a per-barrel dollar subsidy.

We believe that the financial markets can be utilized in a fashion which would allow the Energy Department to take full advantage of the current historically low world crude oil prices on economically attractive terms within the necessary fiscal constraints.

The graph in exhibit 2 depicts historic crude oil price levels. For ease of reference, we have chosen to use West Texas Intermediate, which I will refer to as WTI, as the crude oil reference.

In exhibit 3, we have plotted the DOE's most current future price projections, together with the average purchase price of the 551 million barrels currently held in the SPR. For purposes of this comparison, we have converted the DOE's data, which is based upon the imported refiner acquisition cost, which is the average price paid by refiners for imported oil, to a measure consistent with the WTI crude. In other words, a premium of $1.50 has been added to each statistic to allow for the price differential between light WTI and the heavier imported composite of crudes which the DOE to this point in time has chosen to place in the reserve.

Senator BRADLEY. This is West Texas Intermediate exhibit 3?

Mr. LEVINSON. That's correct. If you look, the red line going up and down on the left-hand side, the left-hand piece—the red line on the left is the actual WTI price for the last 10 years. And from this point forward, we have a blue low end estimate and a green high end estimate which are actually the most recent Department of Energy projections for future oil prices. The horizontal line at approximately $28 a barrel is the current average purchase price of the oil that is currently in the reserve.

It is the commonly held view, as is shown on the graph here of increasing oil prices, it would clearly be in the public interest to increase the SPR fill rate from the current 57,000 barrels per day.

An increase to 100,000 barrels, which we believe is well within the tolerance of the current market environment, would enable the remaining 200 million barrels currently authorized to be acquired in just over 5 years rather than the 9½ years necessary at the current fill rate. A rate in excess of 100,000 barrels per day is conceivably possible. We have chosen to use 100,000 for exemplary purposes here today.

We believe that the markets would allow the proposed goals to be achieved through a variety of financial structures. Each of these potential structures has its own set of advantages and drawbacks. We will be pleased to discuss these variations at the appropriate time, and I understand that the examples that we are going to go through are somewhat complex. But in the interest of brevity, we have chosen one sample structure to present today.

This example, which is diagrammed in exhibit 4, utilizes a financial intermediary to finance purchases of oil on behalf of the Energy Department and to pay suppliers at the DOE's direction over a five-year period. All purchases would be accounted for within quarterly periods, and actual payment would be made to suppliers 30 days after each lifting, in accordance with standard industry practice. Interest would begin to accrue at the time when suppliers are paid. Repayment of the outstanding principal would be made by the Department of Energy at the end of the 5-year period. Interest would be paid by the Energy Department either semiannually or at maturity at a rate of interest equal to a fixed spread, which I will refer to as a subsidy, below the market interest rate on a similar duration Treasury note.

For purposes of this example, we have assumed that the interest rate subsidy would be 50 basis points, one-half of 1 percent per annum. While this subsidy would vary with market conditions, we believe that 50 basis points is a reasonable estimate of the current market.

The subsidies provided in the structure would require a constant floor price on oil purchases and a commitment from the Department of Energy to purchase the full 10 million barrels of oil per quarter whenever the market price of oil is at the floor price or lower. In this case to achieve the 50 basis point subsidy, the approximate floor price on a WTI basis would be $13.50 per barrel on the quantity of 10 million barrels per quarter for the 5-year period. period.

Senator BRADLEY. How did you reach $13.50?

Mr. LEVINSON. The $13.50 is based upon a level at which it would be possible in our opinion to achieve a large enough economic benefit to offset the interest rate subsidy that would be payable on an indeterminate number of dollars. As we go through the balance of the presentation, perhaps it will become slightly clearer. I would be happy to come back to that question a bit later on.

The $13.50 would equate to a floor of approximately $12 per barrel on the imported refiner acquisition cost basis. So, in other words, the $13.50 on WTI is approximately equal, assuming that the Department of Energy continued to import the same quality crudes they are now to a $12 floor price on the current imported mix of oils.

In all cases there would be no need for a cash outlay at any time during the 5-year period. At the end of the period, the Department of Energy would repay to the financing entity the full amount expended for oil purchases over the term, plus interest at the rates described above. However, for any barrels purchased at prices below the floor price, principal plus interest would be based upon that floor price of $13.50.

In exhibit 5, we have shown the floor price as it relates to the historic——

Senator BRADLEY. Take exhibit 4. Work through that exhibit.

Mr. LEVINSON. Exhibit 4 starts essentially——

Senator BRADLEY. Where do you begin?

Mr. LEVINSON. We can start with the oil producer on the left side, and we are tracing across the top line the flow of oil. Oil would flow, as it does right now, directly from the producer through the Department of Energy which would control the procedures for——

Senator BRADLEY. I understand that.

Mr. LEVINSON. The payments down below essentially trace the flow of bonds which would be the oil payment 5 years hence with the $13.50 floor going to the financial intermediary from the Department of Energy.

Senator BRADLEY. And that payment isn't made for 5 years.

Mr. LEVINSON. No payment is made until 5 years from now. Five years from the commencement of this program that amount would become due and payable.

Senator BRADLEY. But the oil starts to flow immediately.

Mr. LEVINSON. The oil flows immediately. The objective here is to get oil into the reserve as rapidly as possible.

The interest payments could be made each 6 months, in which case a budgetary outlay would be necessary, or the interest could be deferred as well and paid entirely at maturity along with the principal——

Senator BRADLEY. And the interest rate?

Mr. LEVINSON. The interest rate in this example would be 50 basis points below the rate that the U.S. Treasury currently gets on a similar duration borrowing.

Senator BRADLEY. And you get that interest rate reduction because you are guaranteeing a floor?

Mr. LEVINSON. That is correct.

Senator BRADLEY. And then what is that arrow that goes back up to the oil well?

Mr. LEVINSON. The financial intermediary would be making payments constantly over the 5-year period to oil producers 30 days after each delivery of oil is made to the strategic petroleum reserve. So, the intermediary is constantly paying oil producers for the oil as delivered.

Senator BRADLEY. Where does he get the money if the payment isn't made for 5 years?

Mr. LEVINSON. The intermediary would have to finance that in the open market and could do so, presumably, based upon the guarantee of the Department of Energy to pay 5 years hence.

Senator BRADLEY. I see. So, in the open market, what would you do?

Mr. LEVINSON. This could be handled in a variety of ways. The simplest way to think about it is that the intermediary would issue securities in a very standard structure. If one wanted to use a less standard structure, such as oil linking them, that would certainly be possible as well. To think about it in the simplest form, they would simply be raising money based upon the credit of this company which is based upon a commitment on the part of the Department of Energy to pay 5 years hence. And they would issue securities in the most expeditious fashion.

Senator BRADLEY. They would hold the risk, but it would be why only a five-tenths of 1 percent reduction?

Mr. LEVINSON. Well, the U.S. Government borrows at what is presumably a market rate. In order to finance that reduction, the intermediary is taking advantage of this floor price which we have discussed. If we were to raise the floor, the reduction could be substantially larger.

Senator BRADLEY. How did you arrive at five-tenths of 1 percent? Have you worked this through?

Mr. LEVINSON. We have worked this through on our own economic analysis. We started with the floor price of $13.50, which in the next piece of the presentation I will discuss why we think that is approximately a price that should be considered comfortable given historic price movements in oil. And we worked backward from that number to see how large a subsidy we felt the market could provide in an economic fashion. And we believe that that number is approximately 50 basis points currently.

Senator BRADLEY. Do you have that analysis available?

Mr. LEVINSON. The analysis is not part of the package. We consider that somewhat proprietary and would be happy to discuss it in a more private setting.

Senator BRADLEY. It's all public. So, if you can't talk about it, then we won't talk about it. No problem. It is just for my own thought process. Naturally I am saying why not a point and a half as opposed to five-tenths of 1 point. Before anything could be agreed to, you would have to justify why the subsidy.

Mr. LEVINSON. That's correct. And we believe that number can be judged against current market standards. If one wanted to achieve a larger subsidy, that easily could be accomplished by raising the floor level or by adjusting one of the other parameters.

Senator BRADLEY. And you assume in all of this that this is a bid.

Mr. LEVINSON. Excuse me?

Senator BRADLEY. You assume in all this this is a bid.

Mr. LEVINSON. That would be a reasonable assumption for the moment.

Senator BRADLEY. All right.

Mr. LEVINSON. In exhibit 5, we have shown the floor price on oil that we are proposing as it relates to the historic and projected prices shown in exhibit 3. You can see from the very small area marked by the arrow in exhibit 5, the area below the dotted line, which is the $13.50 floor price, that the floor level historically over the last 10 years would only have been activated for a very short period in 1986 following the oil price collapse.

Any predictions of future oil prices are far from certainty. It is rather generally accepted within the oil markets that prices are

unlikely to remain much below the floor price of $13.50 on a WTI basis for a significant period of time since the fixed production costs would make it uneconomic for a significant number of current oil producers to produce at lower prices.

Given the history of the strategic petroleum reserve and its public policy purpose, a case can be made that oil purchases at the floor price clearly meet the long-term objectives of the SPR.

The interest rate subsidy provided to the Energy Department, 50 basis points in this example, is free from any ceiling on its value. As oil prices rise, the amount of principal necessary to fund oil purchases grows. The dollar value of the subsidy, therefore, would rise under that scenario.

For example, if in one calendar quarter 10 million barrels of oil are purchased at an average price of $17 per barrel, the total cost of the oil would be $170 million, and the 50 basis point subsidy on that amount would accrue to $850,000 annually. If oil prices rose to $27 per barrel, the total cost of a quarter's purchases would be $270 million and the subsidy would be worth $1,350,000 annually. That is on each 10 million barrel amount which we would accrue over the entire 200 million barrels.

Senator BRADLEY. But it's the same five-tenths of 1 percent.

Mr. LEVINSON. That's correct on a larger number of dollars. So, the dollar value of the subsidy per barrel of oil is a function of future oil prices. And that risk we are proposing by the intermediary and the benefits passed through it to the United States.

Senator BRADLEY. But the higher price would have an upside potential for the investor, though, wouldn't it?

Mr. LEVINSON. No, sir. The value of the subsidy would grow, but the dollar obligations would be constant in the sense that however much is financed is the principal amount to be repaid.

Senator BRADLEY. All right.

Mr. LEVINSON. Exhibit 6 shows the cumulative net dollar savings on oil purchased in the structure versus oil purchased at market prices under the average pricing projected for the next 5 years by the DOE. In other words, if we took the average of their upper and lower bands, this is what the cumulative savings in interest would look like over simply going out and financing the purchases through the Treasury. The big advantage of this is not so much the savings is the fact that it allows oil to be purchased more rapidly.

In summary, we feel that the structure outlined would offer the following benefits as shown in exhibit 7, and they are that it would allow for cash outlays for strategic petroleum reserve oil purchases to be deferred for the next 5 years, and would require no budget expenditures during that period.

The nominal cost of financing strategic petroleum reserve purchases would be significantly less than comparable Treasury borrowing rates.

Number three, should spot oil prices be less than the floor price, the opportunity cost of the floor structure would be more than offset by the benefit of substantial purchases at price levels significantly below the strategic petroleum reserve's average per barrel cost to date.

Number four, should spot oil prices increase significantly over the next 5 years, benefits would not only accrue from having in-

creased the rate of fill during the time of low oil prices, but also the value of the interest rate subsidy would rise as oil prices rise since the principal amount being subsidized would grow proportionately with oil prices.

Senator BRADLEY. That is the five-tenths of a bigger number.

Mr. LEVINSON. That's correct.

Finally, the strategic policy objectives of the strategic petroleum reserve would not be restricted and SPR procedures would remain unchanged including those related to ownership, control and crude purchase agreements.

In sum, this structure allows the Department of Energy to take full advantage of the current historically low world oil prices within the environment of fiscal constraint.

As we noted earlier, we have provided detail on one example structure. There are many variations possible of which we have alluded to a few. We would be more than happy to answer any questions concerning variations or on this example either now or in the future.

[The prepared statement of Mr. Levinson follows:]

UNITED STATES SENATE

Committee on
Energy and Natural Resources

* * *

Oversight Hearing on the Current Status and Outlook for the Strategic Petroleum Reserve

* * *

Remarks of
Allen J. Levinson
Managing Director

Robert L. Cummings
Vice President

Bankers Trust Company
August 8, 1988

My name is Allen Levinson. I am a Managing Director of Bankers Trust Company where I am responsible for derivative products businesses within our Global Markets Division. Accompanying me today is Robert Cummings who is a Vice President responsible for our investment banking business development effort in Washington.

We appreciate this opportunity to appear before this committee and to discuss with you some of the newer financial market innovations which we believe could be quite relevant to financing future oil purchases for the Strategic Petroleum Reserve ("SPR"). We believe that these concepts can provide the Department of Energy ("DOE") with significant budgetary and economic benefits, and at the same time, preserve the existing procurement procedures and strategic objectives of the SPR. In other words, there is currently an opportunity to increase the fill rate of the SPR to take advantage of historically low oil prices and to defer all expenditures at a below market interest rate.

By way of background, we initiated our discussions on the SPR with the DOE approximately one year ago as part of our objective of putting investment banking experience to work for the Federal Government. Based upon these discussions, we believe that the public policy objectives of the SPR can be most efficiently met through financial solutions allowing for significantly increased purchases of crude oil for the reserve. Exhibit #1 sets forth the constraints we have assumed any financial plan must meet to reflect the complex environment in which the SPR must be managed. These are:

1. The DOE should maintain ownership of and control over SPR inventories to meet any energy supply emergency.

2. The DOE should continue to select suppliers and crude types, and to negotiate payment and pricing terms.

3. Oil purchases must be financed in a fashion consistent with current budgetary constraints.

4. The deferred payment obligations should be provided on advantageous economic terms -- for example, a below-market interest rate, an up-front cash payment, or a per-barrel dollar subsidy.

We believe that the financial markets can be utilized in a fashion which will allow the DOE to take full advantage of the current historically low world crude oil prices, on economically attractive terms, within the necessary fiscal constraints.

The graph in Exhibit #2 depicts historic crude oil price levels. For ease of reference, we have used West Texas Intermediate (WTI) as the crude oil reference. In Exhibit #3, we have plotted the DOE's most current future price projection ranges, together with the average purchase price of the 551 million barrels currently held in the SPR. For purposes of this comparison, we have converted the DOE's data, which is based upon the "imported refiner acquisition cost," the average price paid by refiners for imported oil, to a measure consistent with West Texas Intermediate crude. A premium of $1.50 has been added to each statistic, to allow for the price differential of light WTI crude over the heavier imported composite of crudes.

If the commonly held view of increasing oil prices as reflected in the DOE's projections is correct, it clearly would be in the public interest to increase the SPR fill rate from the current 57,000 barrels per day. An increase to 100,000 barrels, which we believe is well within the tolerance of the current market environment, would enable the remaining 200 million barrels authorized to be acquired in just over 5 years, rather than the 9-1/2 years necessary at the current fill rate.

We believe that the markets would allow these proposed goals to be achieved through a variety of structures. Each of these potential structures has its own set of advantages and drawbacks. We will be pleased to discuss these variations at the appropriate time, but in the interest of brevity, we have chosen one sample structure to discuss today.

This example, as diagramed in Exhibit #4, utilizes a financial intermediary to finance purchases of oil on behalf of the DOE, and to pay suppliers at the DOE's direction over a five year period. All purchases would be accounted for within quarterly periods, and actual payment would be made to suppliers 30 days after each lifting, in accordance with standard industry practice. Interest would begin to accrue at the time when suppliers are paid. Repayment of the outstanding principal would be made by the DOE at the end of the five year period. Interest would be paid by the DOE semi-annually (or at maturity) at a rate of interest equal to a fixed spread (or subsidy) below the market rate on a similar duration Treasury Note (or zero coupon STRIP) at the time suppliers are paid. For purposes of this example, we have assumed that the interest rate subsidy would be 50 basis

points (1/2 of 1% per annum). While this subsidy amount would vary with market conditions, we believe 50 basis points to be a reasonable estimate of the current market.

The subsidies provided in this structure require a constant floor price on oil purchases, and a commitment from the DOE to purchase the full 10 million barrels of oil per quarter, whenever the market price of oil is at the floor price or lower. In this case, to achieve the above subsidy, the approximate floor price would be $13.50 per barrel (WTI basis) on the quantity of 10 million barrels per quarter for the five year period. This floor price would equate to a floor of $12.00 per barrel on the "imported refiner acquisition cost" basis. In all cases, there would be no need for a cash outlay at any time during the period. At the end of the period, the DOE would repay to the financing entity the full amount expended for oil purchases over the term, plus interest at the rates described above. However, for any barrels purchased at prices below the floor price, principal plus interest would be based upon that floor price of $13.50 per barrel.

In Exhibit #5, we have shown the floor price on oil as it relates to the historic and projected prices shown in Exhibit #3. As you can see from the area marked by the arrow in Exhibit #5, the floor level would only have been activated historically during a short period in 1986 following the oil price collapse. While any predictions of future oil prices are far from a certainty, it is rather generally accepted within the oil markets that prices are unlikely to remain much below the floor level of $13.50 for a significant period of time since fixed production costs would make it uneconomic for a significant number of current oil

producers to produce at lower prices. Also, given the history of the SPR, and its public policy purpose, a case can be made that oil purchases at the floor price clearly meet the long term objectives of the SPR.

The interest rate subsidy provided to the DOE, 50 basis points in this example, is free from any ceiling on its value. Therefore, as oil prices rise, and the amount of principal necessary to fund oil purchases grows, the dollar value of the subsidy rises. For example, if in one calendar quarter 10 million barrels of oil are purchased at an average price of $17 per barrel, the total cost of the oil would be $170 million, on which the 50 basis point subsidy would total $850,000 annually. If oil prices rose to $27 per barrel, the total cost of a quarter's purchases would be worth $1,350,000 annually. Exhibit #6 shows the cumulative net dollar savings on oil purchased in this structure, versus oil purchased at market prices, under the average pricing projected for the next five years by the DOE.

In summary, we feel that the structure outlined would offer the following benefits, as shown in Exhibit #7:

1. It would allow cash outlays for SPR oil purchases to be deferred for the next 5 years, and would require no budget expenditures during that period.

2. The nominal cost of financing SPR purchases would be significantly less than comparable Treasury borrowing rates.

3. Should Spot Oil prices be less than the floor price, the opportuninty cost of the floor structure would be more than offset by the benefit of substantial purchases at price levels significantly below the SPR's average per barrel cost to date.

4. Should spot oil prices increase significantly over the next five years, benefits would not only accrue from having increased the rate of fill during the time of low oil prices, but also, the value of the interest rate subsidy would rise as oil prices rise, since the principal amount being subsidized would grow proportionately with oil prices.

5. The strategic policy objectives of the SPR would not be restricted and SPR procedures would remain unchanged, including those related to ownership, control and crude purchase agreements.

In sum, this structure allows the DOE to take full advantage of the current historically low world oil price within the environment of fiscal constraint.

As noted earlier in this presentation, we have provided detail on one example structure. Many variations on the theme are possible. We would be pleased to answer any questions that you might have at this time, and obviously would be pleased to pursue the matter in the future with the appropriate parties.

FILLING THE STRATEGIC PETROLEUM RESERVE: A LOW-COST ALTERNATIVE

Exhibits presented to the
Committee on Energy and Natural Resources
of the United States Senate

* * *

Bankers Trust Company
August 8, 1988

OBJECTIVES/CONSTRAINTS

EXHIBIT 1

* Allow DOE to maintain ownership/control over SPR inventory to meet energy supply emergency

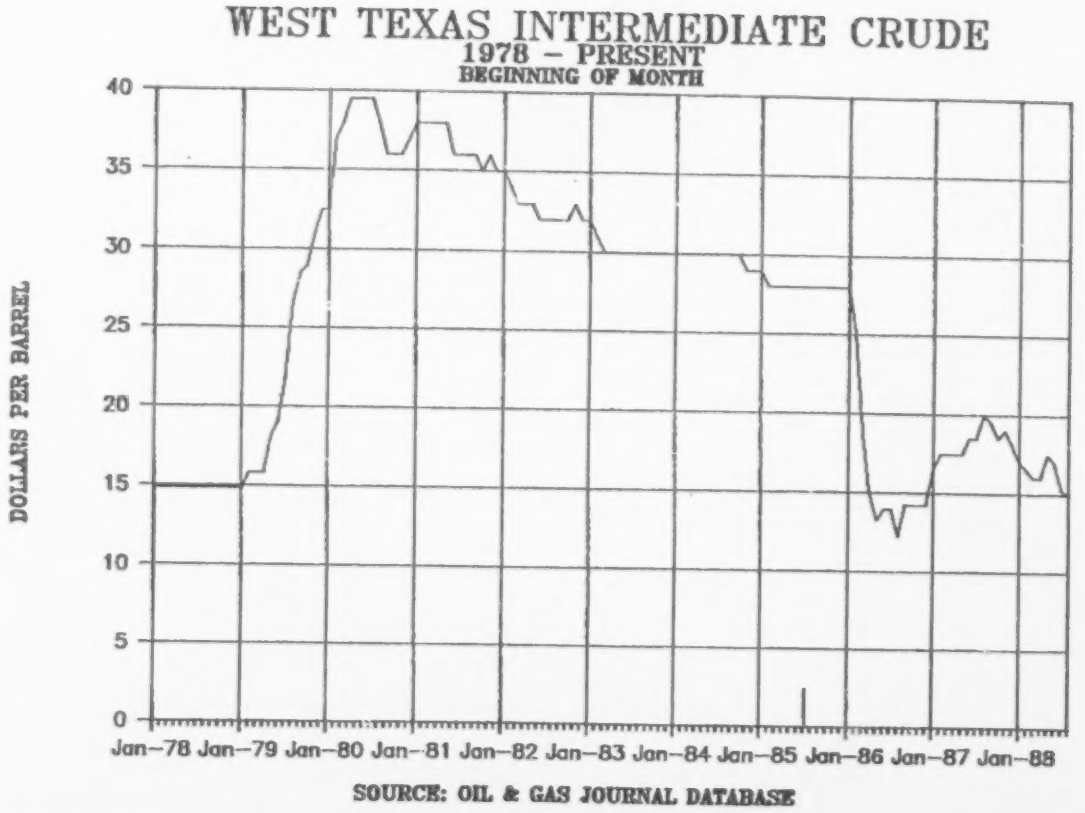
* Permit DOE to continue to select suppliers, crude type, and negotiate payment/pricing terms

* Finance oil purchases within current budgetary constraints

* Provide DOE with advantageous deferred payment obligation

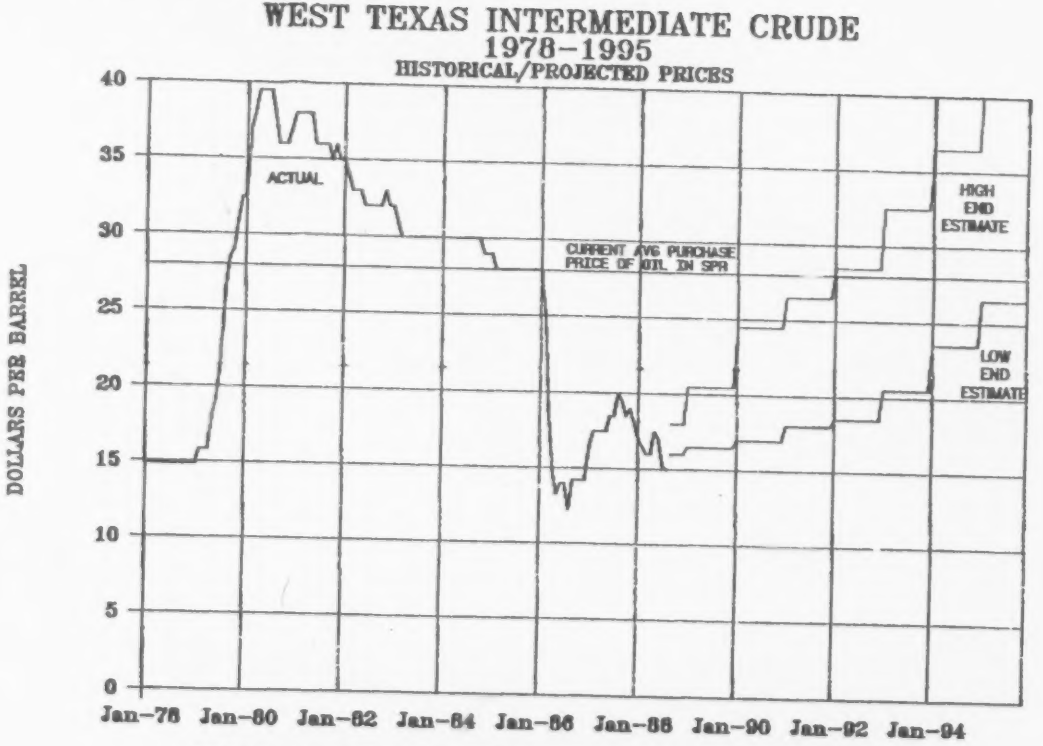
HISTORICAL OIL PRICES

EXHIBIT 2



DOE PROJECTED OIL PRICES

EXHIBIT 3

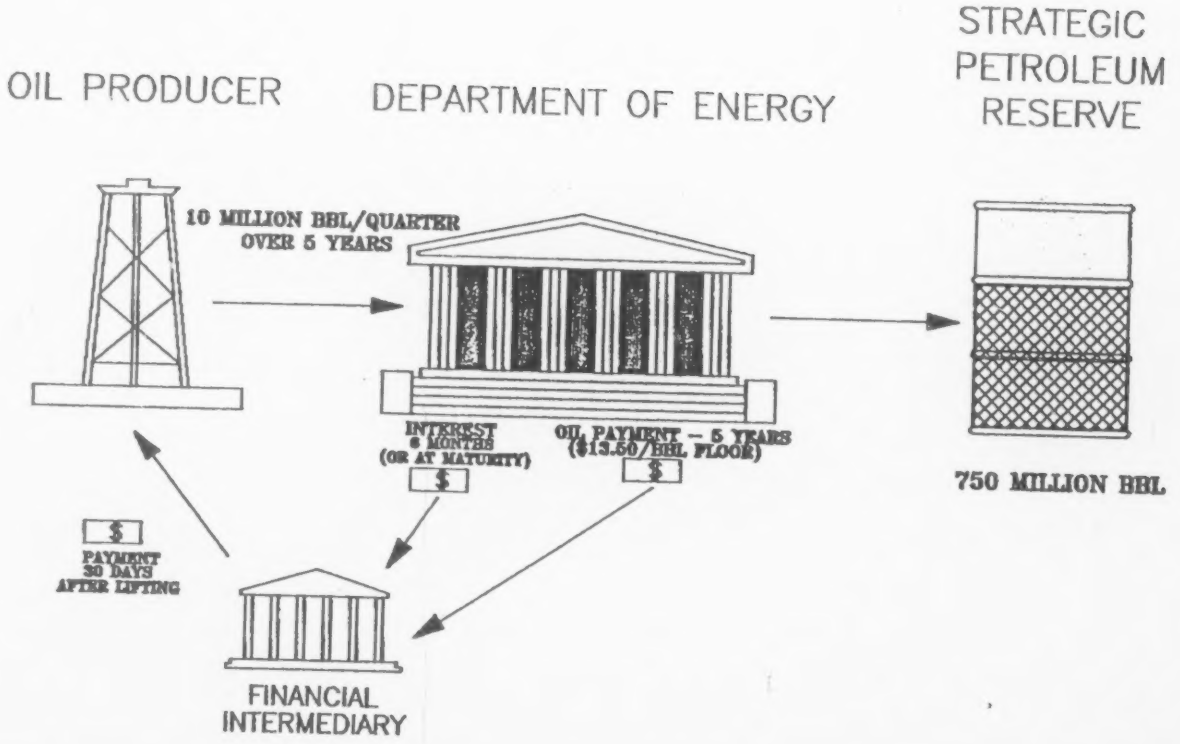


SOURCE: OIL & GAS JOURNAL DATABASE; DEPT OF ENERGY ESTIMATES

Note: All estimates are based on "importer refiner acquisition cost" and have been adjusted upward by $1.50/bbl to restate on a WTI-equivalent basis.

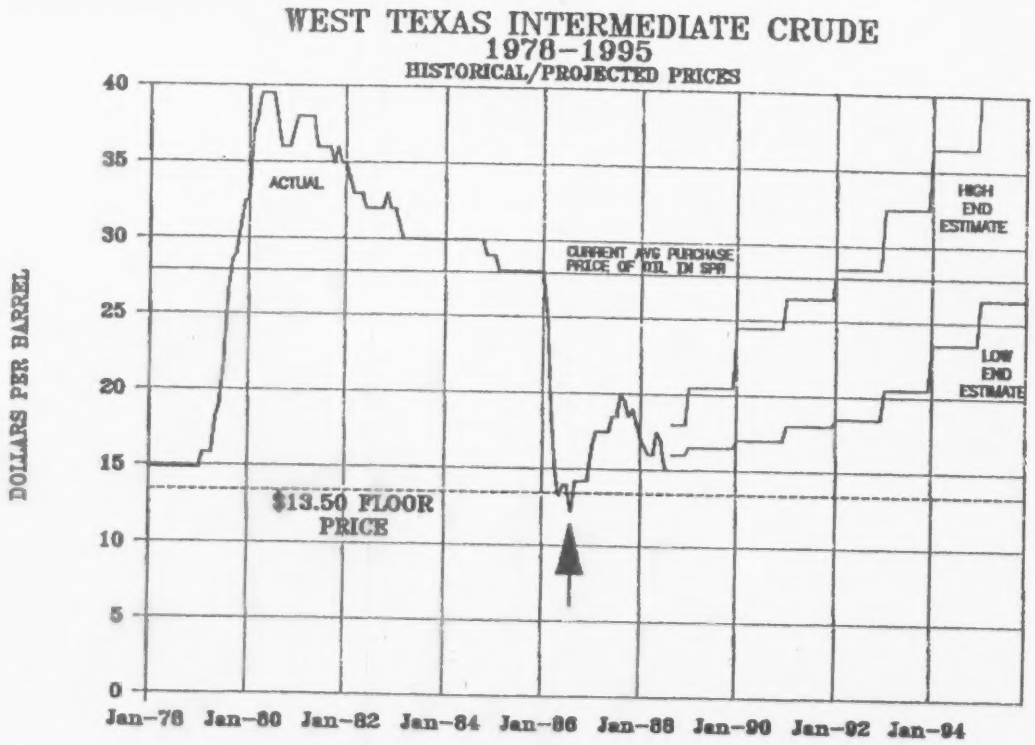
EXAMPLE STRUCTURE

EXHIBIT 4



PROPOSED FLOOR PRICE

EXHIBIT 5

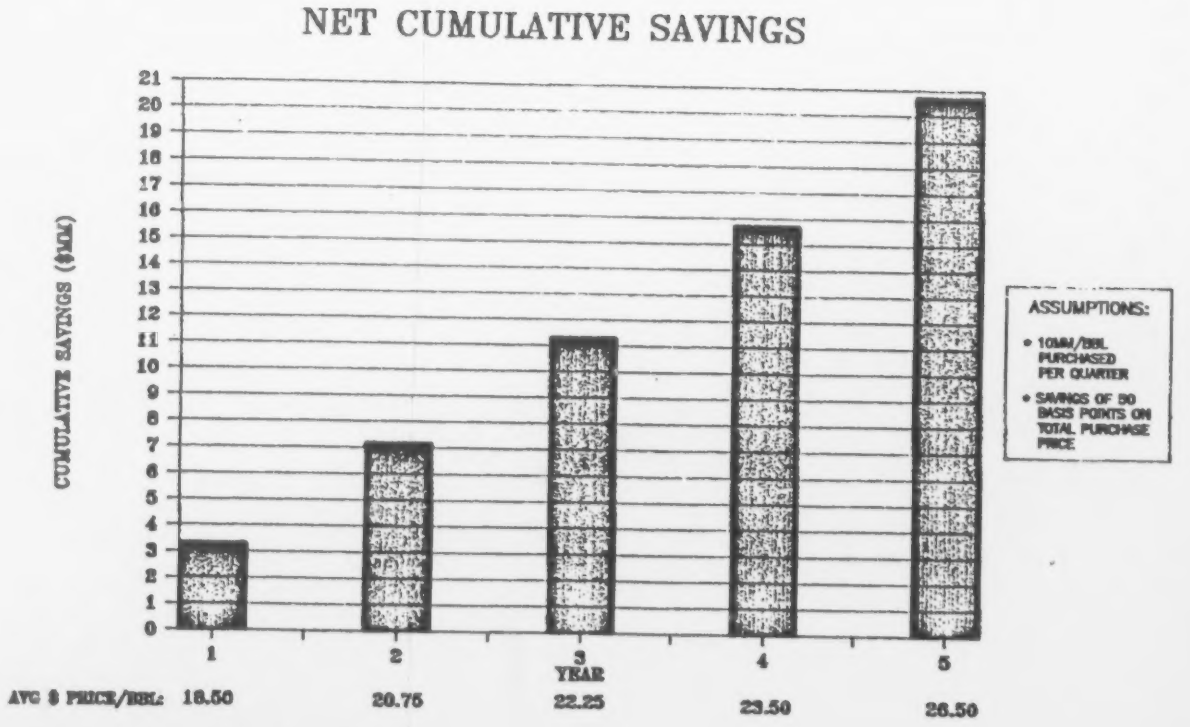


SOURCE: OIL & GAS JOURNAL DATABASE; DEPT OF ENERGY ESTIMATES

Note: All estimates are based on "imported refiner acquisition cost" and have been adjusted upward by $1.50/bbl to restate on a WTI-equivalent basis.

SAVINGS SCENARIO

EXHIBIT 6



SOURCE: DOE AVERAGE PRICE ESTIMATES
Note: All estimates have been adjusted upward by $1.50/bbl to restate on a WTI-equivalent basis.

SUMMARY OF BENEFITS

EXHIBIT 7

* Allows deferral of cash outlays for SPR oil purchases for 5 years, and requires no budget expenditure during period

* Provides financing of SPR purchases at cost significantly below comparable Treasury borrowing rates

* Offsets any opportunity cost of floor price in low price environment with purchases of additional oil sigificantly below current SPR average costs

* Increases value of subsidy as oil prices rise and allows for increased rate of fill during time of lower oil prices

* Does not restrict strategic policy objectives of SPR or change existing ownership, control, or crude purchase agreements

Senator BRADLEY. Is the five-tenths of 1 percent and the $13.50 what you would propose if the plan was implemented today?

Mr. LEVINSON. We think that that is one of a variety of possibilities based upon the objectives as outlined. As we understand the objectives from a public policy point of view, that would be our recommendation.

Senator BRADLEY. Why only 5 years as the term?

Mr. LEVINSON. We simply picked that because it would get us to the 750 million which we believe is the currently authorized capacity. The term and the total amount of oil purchases we believe from a public policy point of view perhaps should be even larger yet and even more rapid. Those numbers were picked based upon what we perceive to be the capacity constraints as set by the current program.

If a commitment was made to an enlarged total capacity of the SPR, we would recommend more purchases at a more rapid pace and perhaps for a longer period of time. And it could be financed by exactly this type of structure.

Senator BRADLEY. What about $11 instead of $13.50?

Mr. LEVINSON. That would be possible. Where that price comes out is a function of a few different variables. One is the size of the subsidy. Another is current market oil prices. As of today's market, to achieve a floor of $11 instead of $13.50, we would probably make that subsidy need to disappear and you would find it would not be economic to do that currently. Should oil prices come down somewhat over the next period of time, that may be very possible and still achieve a subsidy.

We think that from a public policy point of view taking advantage of prices anywhere in this range is very important and needs to be done expeditiously.

Senator BRADLEY. Do you know how CBO would score your proposal?

Mr. LEVINSON. We believe that that is subject to interpretation. It would require more research.

Senator BRADLEY. So, the answer is no.

Mr. LEVINSON. We have had some discussions. It is not clear what the answer would be.

Senator BRADLEY. Okay.

Do you know, has any government ever issued these kinds of bonds before?

Mr. LEVINSON. The type of financing that we are talking about here has been brought to market in many cases in the private sector. I believe that there are foreign governments that have issued bonds in this fashion. To the best of my knowledge, nothing like this has been done in the United States.

Senator BRADLEY. Do you know which foreign governments?

Mr. LEVINSON. I would have to look at specific agencies. I believe that there are some European government agencies that have used financing techniques very similar to this. Each structure is slightly different. For example, I believe that Belgium has issued securities in a fashion similar to this. We believe that Turkey has. Similar things have been undertaken in France as well.

Senator BRADLEY. Who did those?

Mr. LEVINSON. I couldn't tell you off the top of my head.

Senator BRADLEY. Is there anything else you want to say about the proposal?

Mr. LEVINSON. Thank you very much.

Senator BRADLEY. Thank you. It is another example of an intriguing idea, innovative idea. I appreciate your taking the time to come down and share your opinion and suggestion with the committee.

Clearly something is going to happen in this area some time in the next year or two. And I would urge you to continue your negotiations with the CBO, as I did the first panel. Thank you very much.

Our next and final witness is Edward Krapels from Energy Security Analysis, Inc., Washington, DC. Welcome to the committee, Mr. Krapels. I understand that you are prepared to talk generally about the SPR. Feel free to make any comments about earlier testimony or your own views. Welcome.

STATEMENT OF EDWARD N. KRAPELS, PRESIDENT, ENERGY SECURITY ANALYSIS, INC., WASHINGTON, DC

Mr. KRAPELS. Thank you. Thank you, Mr. Chairman.

I was in Mexico last week when the invitation was sent to testify. I didn't have time to prepare anything written.

But I have been an SPR groupie from longer than I care to remember. And in light of the testimony earlier today, let me only very briefly review what other countries have done to finance their SPR's because some creative financing mechanisms have been developed outside the borders of the United States.

Senator BRADLEY. Before you do, could you tell us what Energy Security Analysis, Inc., does?

Mr. KRAPELS. Yes, sir.

Senator BRADLEY. And you are its director, right?

Mr. KRAPELS. Pardon?

Senator BRADLEY. You are the director?

Mr. KRAPELS. I am the president of the company. We are an oil market analysis firm doing about 95 percent of our work for the private sector.

Senator BRADLEY. And you did write this report last year?

Mr. KRAPELS. Yes, I did. That report is called SPR Watch, and it was an analysis of how a Persian Gulf disruption could be mitigated if the SPR were used. It was really a brainstorming session on our part to try to think through what the issues would be.

Senator BRADLEY. And you concluded that if it used effectively, it has a dramatic impact on price.

Mr. KRAPELS. It could, sir, if it was used quickly and massively so that it would have an impact on the perceptions of the marketplace as much if not more than the physical barrels coming into the market.

Senator BRADLEY. The fact that it is there is as important as that it would be used up?

Mr. KRAPELS. That's correct.

Senator BRADLEY. So, does that mean you are for a 750 million barrel or a billion barrel SPR?

Mr. KRAPELS. Well, I find very persuasive the argument that as our import levels increase, to hold the number of days constant, it would be very useful to have a bigger than 750 million barrel SPR.

Senator BRADLEY. Are you comfortable with the procedures that we have in drawdown?

Mr. KRAPELS. No, sir. I think they would probably be too time consuming, and that ways need to be found to put the oil in the market even more quickly.

Senator BRADLEY. Quicker than three weeks?

Mr. KRAPELS. Yes. To the extent that it is possible, I think DOE is presently looking at and has commissioned another study on how to use financial instruments for the futures market as a way of making the SPR's presence felt. And I think that is an excellent idea because it is in that market that the fear of shortage would show up first. A lot of players in that marketplace are only dimly aware of the existence of the SPR and everything possible needs to be done to make them more aware of it.

Senator BRADLEY. Please feel free to make your comments on other countries' financing mechanisms.

Mr. KRAPELS. Well, there are three basic approaches to financing emergency reserves. The pioneering country was France which first identified 90 days as the magic number. The French started their program by requiring oil companies to hold the stocks and to finance them in an atmosphere of price regulations so that the cost of buying and the interest costs of carrying the oil could be passed on in prices in the domestic market. That model, because it was the first, was used by many other European governments and by the Japanese in the early 1970's as they brought their programs on line.

At the other extreme is the U.S. strategic petroleum reserve where the government bears all the costs.

And in the middle are a number of what I will call quasi-public and quasi-private corporations that have been established. And the best specific example I can use is the German company called EBV which stands for Erdolbevorrantungsverband. It is an corporation under public law, which means it is a public corporation, that was able to raise the financing to buy the strategic reserves that the German government wanted with the debt guarantee of the German government. So, the company raised the money, but the guarantee of the debt was a government guarantee.

Senator BRADLEY. And what kind of interest rate differential would that give?

Mr. KRAPELS. I think that with the government guarantee there was no differential. I think it was whatever the rate the government would normally get for government-backed debt. These kinds of institutions are not very unusual in Germany. There are many public corporations.

Senator BRADLEY. So, it is no different than just floating debt?

Mr. KRAPELS. I believe so. The carrying costs of the oil are met by a small tax on petroleum so that in that sense it is the oil consumer and not the general taxpayer to that extent that pays the interest costs. You could argue that it is the taxpayer that bears the contingent liability that the government is carrying under the system.

This program, since the Germans developed it in the mid-1970's, has been embraced by the Dutch, the Danes and a number of other countries as perhaps the most frictionless way of creating strategic petroleum reserves. But I should mention that the reason it is frictionless is because the European alternative has always been thought to be to make the oil companies do it. So, this was a way that the oil industry could argue was a way to take the burden off of them and put it into a shared, if you will, industry-government program.

So, I would commend that to the committee as yet another model to think about for perhaps generating the incremental 250 million barrels. If you wanted to go from 750 million to a billion, perhaps a storage corporation could be set up.

Part of the benefits of a storage corporation is also that it is felt in Germany to be more of a professional organization, more of an oil industry organization close to the industry, using some of the storage facilities of the industry and thereby might be better able to understand the industry's requirements than a government agency. But that is not proven, but that is part of the argument in favor of a public storage corporation.

The last model is Japan where the Japanese have created both the strategic petroleum reserve, totally government-owned and financed, and required oil companies to hold what is called mandatory stocks. So, France is the only country that has imposed the burden both on the private sector and on the public sector. But just for completeness, that is the other model that we can refer to.

Senator BRADLEY. Do you feel that some form of alternative financing, other than the ones you have described, is advisable in the United States?

Mr. KRAPELS. I think either one of the preceding testimonies would be advisable if it helps accelerate the rate of fill because the period of time in which we have these low prices is hard to gauge, but it may not be more than a few years.

Senator BRADLEY. Pardon?

Mr. KRAPELS. The period of time during which we can buy oil at $12 a barrel may not last more than a few years. So, anything that we can do to accelerate the rate of fill has a lot going for it.

Senator BRADLEY. To buy the oil when it is cheap.

Mr. KRAPELS. Yes, sir.

Senator BRADLEY. To fill to what?

Mr. KRAPELS. Well, I think that the 90 day requirement is a good one to hold because we cannot count the commercial stocks as the Department of Energy continues to try to rely on industry stockpiles as if they were strategic reserves. If we just count the SPR in our tally of strategic stocks, as I think we should, then clearly we are going to need more than 750 million barrels to conform with the spirit if not the letter of the International Energy Agency agreement.

Senator BRADLEY. So, you think a billion reserve is a good target?

Mr. KRAPELS. I think a billion reserve would be a tremendous target if we are talking about a situation in the 1990's where imports exceed domestic production, which they will.

Senator BRADLEY. And the sooner the purchases are made, the better?

Mr. KRAPELS. Well, our own projections show that low oil prices could remain in the market for as long as five to seven more years. But clearly at the rate we are going now, we can't even get the 750 million barrels by 1995. So, beyond 1995, there is every indication of strong upward pressure on oil prices. So, I would say a billion barrels by 1995 would be the prudent thing to do.

Senator BRADLEY. A billion barrels by 1995 using all of the above financing mechanisms and still those that might be waiting in the wings.

Mr. KRAPELS. Whatever makes sense.

Senator BRADLEY. You saw no fallacy with either one of the proposals?

Mr. KRAPELS. No, I didn't, Mr. Chairman.

Senator BRADLEY. You were supposed to. That is what we want to know. [Laughter.]

Mr. KRAPELS. Then I'm going to let you down. I think it is the exactly sort of creative thinking that is needed, and not enough has been done by DOE. Over the last 10 years of the dialogue on how to build a petroleum reserve, DOE has not often encouraged innovative thinking in this area. So, I think these are very welcome, and I think they are very interesting.

Senator BRADLEY. And it might make DOE even more interested in their November reports.

Mr. KRAPELS. I would hope so.

Senator BRADLEY. Mr. Krapels, thank you very much. Do you have anything else to say?

Mr. KRAPELS. No, sir. I probably would be able to comment more critically on the previous proposals, but I have not seen them. And I will look forward to reading them very carefully.

Senator BRADLEY. Let me thank you very much for your testimony, as well as all of the witnesses at today's hearings. Everyone was well prepared and did a very thorough job. And I appreciate that very much. Thank you.

The committee will stand in adjournment.

[Whereupon, at 3:38 p.m., the hearing was adjourned.]

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